

In This Issue—Wonderful Future in Maintenance

MOTOR AGE

Vol. XLIII
Number 18

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CHICAGO, MAY 3, 1923

Thirty-five Cents a Copy
Three Dollars a Year

*Someone had
to solve it!*



EFFECTIVE May 15, every Jordan car which has satisfactorily served a Jordan owner and is offered for resale to the public will bear the Mark of Jordan Service.

This is a protected plate, authorized only by the Jordan Company after compliance by the dealer with certain standard regulations.

The Mark of Jordan Service, guarantees to the purchaser that the car on which it appears has been rebuilt in accordance with the national standard Jordan policy, to which every Jordan dealer has subscribed.

The Mark of Jordan Service means that you may purchase any Jordan car, offered for resale with the same assurance with which you would purchase a new Jordan.

Every rebuilt car bearing the Mark

of Jordan Service will be priced and advertised in accordance with the same standard national Jordan policy in every city in which Jordan cars are sold.

This national policy will be permanent and will be widely advertised. It will protect Jordan owners against imposition and guard the public against deception.

It will relieve dealers in other lines of the task of determining what prices should be placed on Jordan cars.

Prices on all Jordan models offered for resale in any zone, will be nationally announced by the Jordan Motor Car Company at regular intervals.

The Jordan car has the highest resale valuation of any car in its class. You may buy with confidence.

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President
Jordan Motor Car Company
Cleveland, Ohio

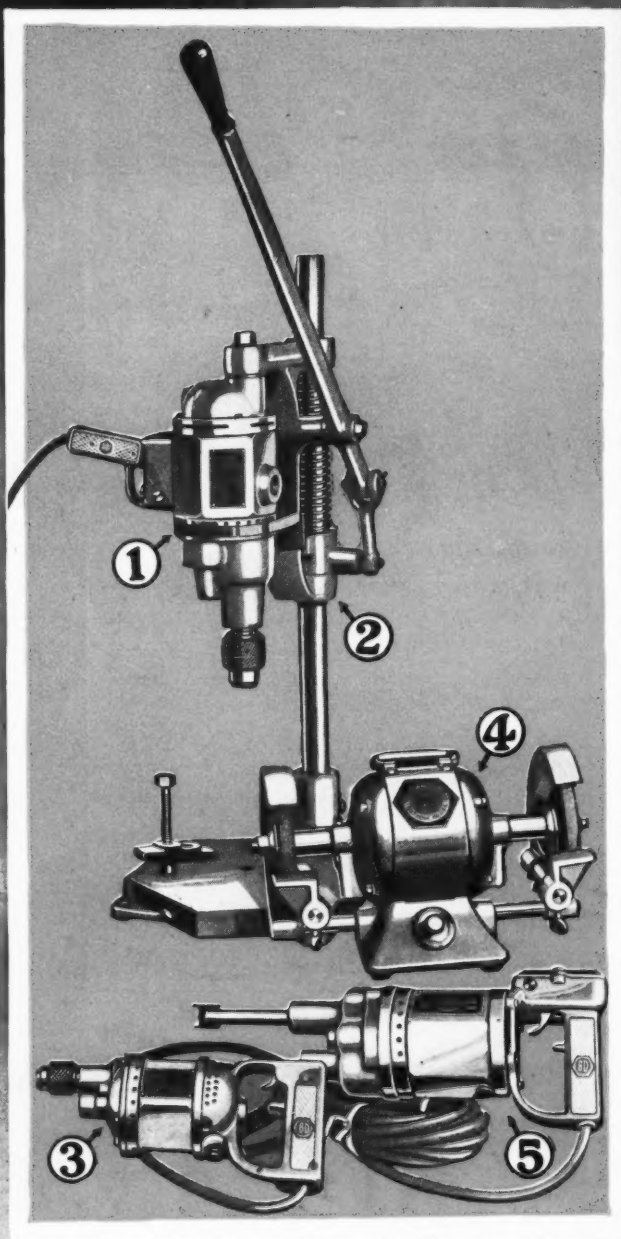
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- ② Bench Drill Stand (Makes a Drill Press of the Portable Drill) \$28
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ONLY \$207

What other five items of shop equipment can you get for only \$207 which will be as useful and make as much profit for you.

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The Best-Equipped Shop Gets the Business

BACKGROUND PATENT PENDING
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Feltbak



Stops Ford Chatter

EVERY Ford owner wants to get rid of the shivering and shaking that occurs every time he tries to stop his Ford. He doesn't know that it's caused by faulty brake lining. He thinks the Ford is "just made that way."

Improper lubrication—even when special oils and devices are used—causes ordinary lining to get hard, flinty and charred. The ordinary lining chatters because oil cannot get to the drums under pressure.

Feltbak is designed correctly to overcome the troubles of the Ford transmission. Feltbak applies oil—under pressure—to the drums.

The felt backing holds the oil. When pressure is applied oil spouts thru the oil holes onto the drums just when it is needed most to prevent burning and glazing.

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Feltbak softens the braking action. Excessive pressure is not needed to stop the car. The Ford starts and stops without jerk or vibration. Feltbak makes the Ford the easiest, most responsive car to handle. Feltbak lasts so long it is far the cheapest—and it actually prolongs the life of the car. Saves expensive rear axle trouble.

Dealers, garages and accessory stores everywhere sell Feltbak or can get it immediately from any wholesale house.

ADVANCE AUTOMOBILE ACCESSORIES CORPORATION
Manufacturers

1721 Prairie Avenue

Dept. 960

Chicago, Ill.

To the Million New Ford Owners

If your Ford shivers and shakes when you want to stop, it's not the car's fault—it's the brake lining.

Your transmission lining is hard and glazed. Improper lubrication caused the linings to burn, char and get hard. You need a lining that will lubricate itself under pressure.

Don't blame your Ford—use Feltbak.

How Feltbak Works

The felt backing absorbs and holds oil like a wick. When pressure is applied, oil is forced through the oil holes onto the surface of the lining. More pressure forces out more oil. Thus the braking surface gets oil during braking action—right when it is needed to prevent burning and glazing.

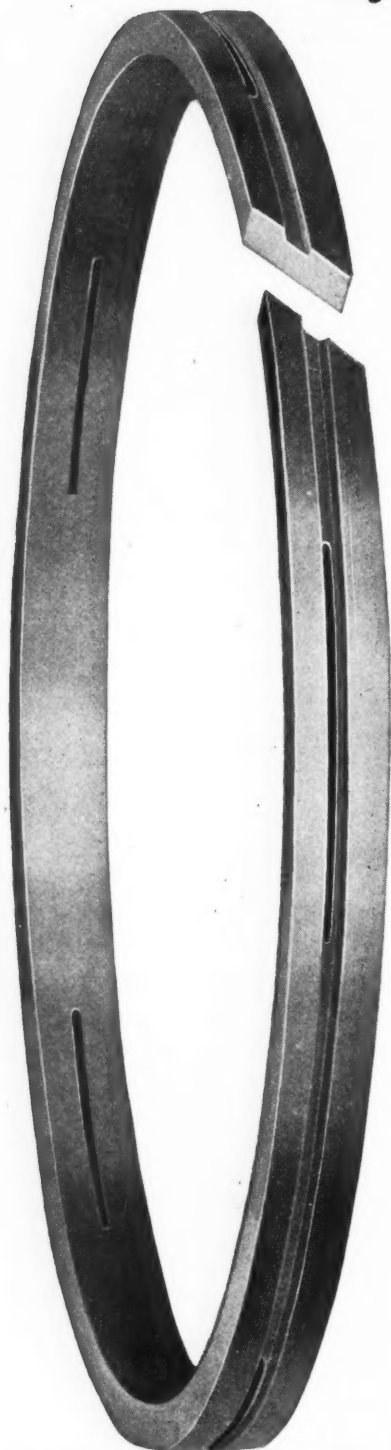
Feltbak is an improvement over the cork-in-fabric brake lining. Corks are held securely in place. Add to this the felt cushion backing and the automatic lubrication to prevent burning and you have the correct brake lining for Fords—**FELTBAK**.

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ADVANCE CORK FELTBAK TRANSMISSION LINING for FORDS  Lubricates itself—softens brake action. Makes Ford most responsive, easiest car to handle. Designed to overcome shivering and shaking.	RED STAR TIMER for FORDS TRUCKS and TRACTORS  The Scientifically Correct Timer for Fords. Roller of 100 point carbon tool steel. Race of bone-hard fibre.	WHITE STRIPE TRANSMISSION LINING for FORDS  Woven and treated for Heavy Duty Fords—Trucks, Commercial Cars	ADVANCE ASBESTOS BRAKE LINING for LARGER CARS  Made from genuine asbestos for use on larger cars. Buy it for Better Brakes and Longer Wear.	WHITE STRIPE FAN BELT for FORDS and LARGER CARS  Outwears six ordinary belts. Never needs adjustment. Stretches and "Comes back" Made for Fords & Larger Cars	DUPLEX SHOCK ABSORBERS for FORDS  The Shock Absorber for rough roads. Eliminates bounce, side-sway, rebound, vibration. Looks like a part of the car.
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The Demand Is There— And Perfect Circles are Filling It!



OIL-REGULATING TYPE, \$1.00 EACH

Up to and including 5 in. diameter
COMPRESSION TYPE, 25c and up

JOBBERs and garagemen who handle PERFECT CIRCLE Oil-Regulating Piston Rings are cashing in on the real and widespread demand that *already exists* among motorists for a piston ring that will *actually stop oil-pumping!*

PERFECT CIRCLE Oil-Regulating Piston Rings fill that demand—and more! For these rings not only stop oil-pumping, but they give an oil-mileage of 1000 to 1500 miles to the gallon. And they provide positive lubrication, always.

The superiority of these rings in stopping oil-pumping has been proved by the trials of everyday service—and by the stringent tests imposed by the manufacturers of such motor cars as Stutz, Marmon, Haynes, and Deussenberg, who use PERFECT CIRCLE Oil-Regulating Piston Rings as standard equipment.

It is the same unquestioned superiority that was responsible for this statement from one of the leading jobbers of Indiana:

"PERFECT CIRCLE Piston Rings are the best repeating line we ever had. We tell our salesmen to sell one set for we know that the orders will start increasing from that time on".

And the satisfaction they give in service is shown by statements from garagemen that they "have made more satisfied customers than any other ring they have ever installed".

Order a trial set of PERFECT CIRCLE Piston Rings. Install them. Watch the results. Then you'll know that you've found the way to fill the demand for a real oil-ring and thereby increase your profits.



PISTON RINGS

Marketed through recognized automotive jobbers, only.

Indiana Piston Ring Company

Hagerstown, Indiana

MOTOR AGE

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The deeper meaning of a Goodrich sign

When you see a Goodrich sign on a tire dealer's store it does not simply mean that Goodrich Tires are sold there.

It means: "Here is a dealer who thinks so much of what his customers will be saying about him next year that he is insuring their loyalty."

"He is dealing in goods that he knows are of one quality only."

He is selling tires which have built up a name and reputation that is as much of an asset to him as it is to Goodrich.

"He knows that the high standing of one quality in materials and one quality in workmanship is converted into a characteristic of his own business."

The Goodrich plan of co-operating with the dealer is interesting, because it is successful. Dealers who want to build permanently are invited to write for details.

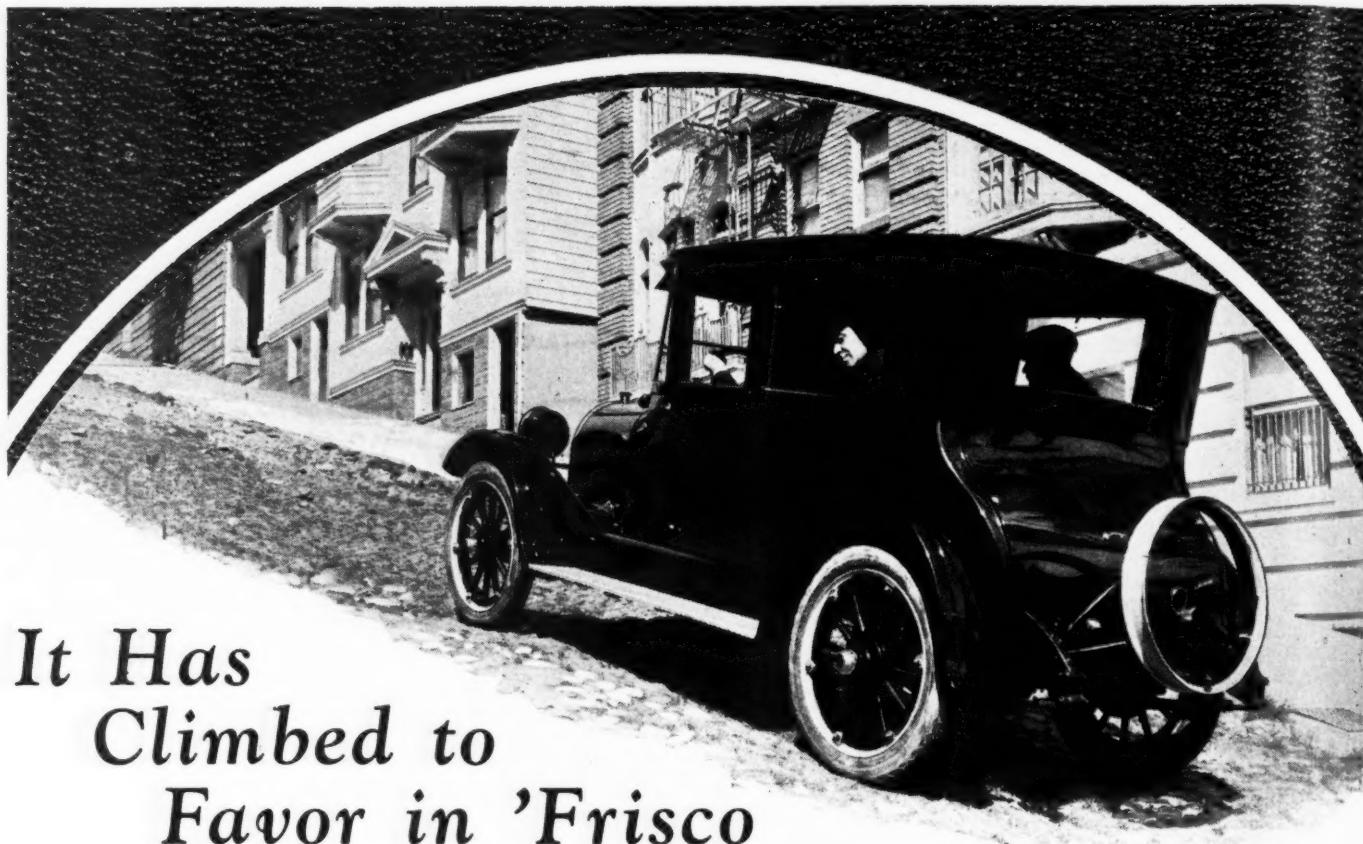
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B. F. GOODRICH RUBBER CO.
Akron, Ohio

Goodrich

TIRES

"Best in the Long Run"



It Has Climbed to Favor in 'Frisco

The above picture of an Oldsmobile Brougham climbing one of San Francisco's steepest streets is a familiar sight in the Golden Gate city.

Its amazing hill climbing ability has made Oldsmobile a highly respected car up and down the Pacific Coast,

and has enabled J.W. Leavitt & Co., California distributors, to build up an enormous business.

Oldsmobile dealers thrive where hills are steepest and the going hardest, for there Oldsmobile best demonstrates the advantages of its oversize construction.

OLDS MOTOR WORKS, LANSING, MICHIGAN
Division of General Motors Corporation

OLDSMOBILE

A PRODUCT OF GENERAL MOTORS

Oldsmobile, as a strong permanent division of General Motors Corporation, enjoys unequalled engineering, research and purchasing facilities. Experienced dealers appreciate the numerous advantages attaching to a franchise with a General Motors division.

19 ^{out}_{of} 33

The Studebaker dealer in a Pacific Coast city sold 19 Studebaker cars in 30 days.

The total number of all motor cars sold in his city during that period was 33.

The Studebaker dealer got 57.6 per cent of the total business.

This remarkable showing—like many other similar ones in points throughout the country—was made possible because of the completeness of the Studebaker line and the confidence the public has in cars of Studebaker manufacture.

The Studebaker dealer, selling three chassis models in thirteen body types, each a six—each a Studebaker—and each the outstanding value in its class, has a car of the right size, type and price for every buyer outside of the very lowest priced field.

The Studebaker dealer could make a pretty good living if he made only those sales which his competitors have to turn down because they can't fit the buyer with the car he wants and needs.

MODELS AND PRICES— <i>f. o. b. factories</i>		
LIGHT-SIX 5-Pass., 112" W. B., 40 H. P.	SPECIAL-SIX 5-Pass., 119" W. B., 50 H. P.	BIG-SIX 7-Pass., 126" W. B., 60 H. P.
Touring.....\$975	Touring.....\$1275	Touring.....\$1750
Roadster (3-Pass.).....975	Roadster (2-Pass.).....1250	Speedster (5-Pass.).....1835
Coupe-Roadster (2-Pass.).....1225	Coupe (5-Pass.).....1975	Coupe (5-Pass.).....2550
Sedan.....1550	Sedan.....2050	Sedan.....2750

THE STUDEBAKER CORPORATION OF AMERICA
South Bend, Indiana

T H I S I S A S T U D E B A K E R Y E A R

Nash Leads the World in Motor Car Value

Take the Case of Weaver of Dover

Down in Dover, Ohio, a town of 8100 people, the Weaver Motor Company handles the Nash line.

They started in business back in 1917 with another line.

But after a while they began to realize that the greatest business-building opportunity for them lay in lining up with C. W. Nash.

And so they applied for the Nash contract—and landed it in September, 1919.

Since then Weaver of Dover has marketed 477 Nash passenger cars and 70 Nash trucks.

Of this number 120 passenger cars and 7 trucks have been sold since September 1st of 1922.

It's another case of the right men and the right line getting together.

There's a good Nash territory ready for you now if you act quickly. Write us today.

NASH

THE NASH MOTORS COMPANY
KENOSHA, WISCONSIN

Nash Leads the World in Motor Car Value



MARMON

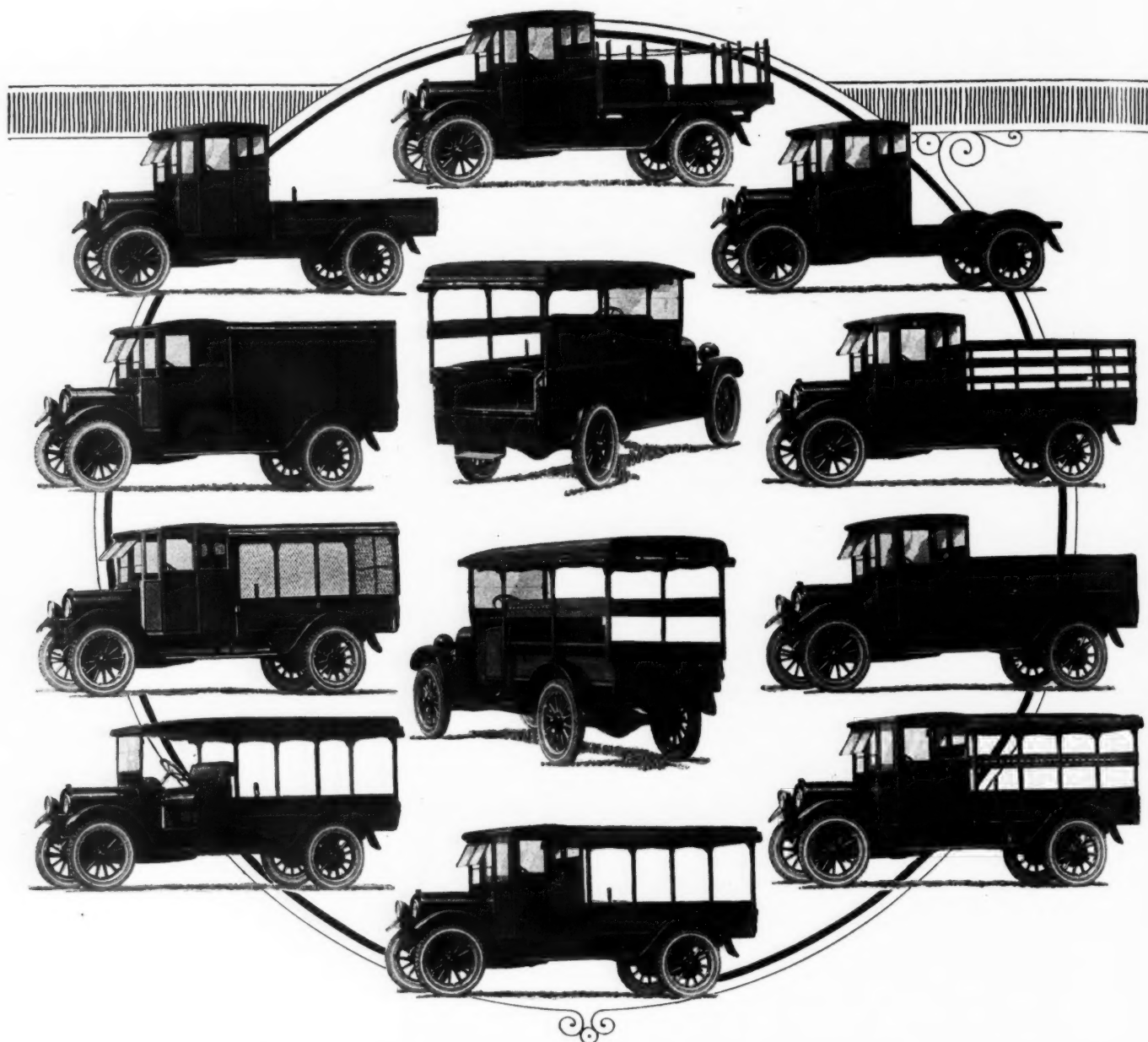
*Go to the Marmon owner to test the
Marmon franchise. The facts and
figures of owners' experiences will
prove to you, as nothing else could,
the growing possibilities of
this remarkable car*

NORDYKE & MARMON COMPANY

Established 1851 • INDIANAPOLIS

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Were the Reo franchise to comprise the selling privilege on only the Mighty Speed Wagon its possession would imply an asset of tremendous value. For with twelve standard bodies, the Speed Wagon represents the most important commercial car sales proposition in the World, BUT—

The Reo franchise further includes the vital sales possibilities of a complete Passenger Car line (five models), a rapid-selling Taxicab, and a Passenger Bus chassis. Truly a line to tie to.

A limited amount of territory is available, and applications from dealers of established integrity will be considered. Write for booklet, "Reasons for Reo."

Reo Motor Car Company, Lansing, Mich.



MOTOR AGE



The boy just out of high school, in addition to the knowledge he has absorbed of English, mathematics, chemistry and so on, is used to discipline and possesses the necessary poise and social standing which makes him preferable for a job in the shop to the man who does not think beyond the hammer and wrench. A higher standard of shop morale is possible because of his better background

What of the Young Man Who Asks for a Job?

Need of Today Is for Some System of Training the Unskilled Worker. Hosts of High School Graduates Offer Big Possibilities for Building Up Excellent Personnel in Maintenance Station. Future Will Likely See Big Development of Automotive Maintenance Engineering

By B. M. IKERT

ONE day a dealer said to us:
 "What I want to know is, why is it that a car owner would rather go to a blacksmith shop than to a garage, so long as the garage charges a fair price and seems to have an otherwise good name in the community?"

We went over to the blacksmith shop and asked the old

blacksmith why the automobile owners came to him when their cars needed repairing. We asked him bluntly:

"What's the matter with the garage fellows?"

He said:

"The trouble with them fellows is, they never learned a trade."

Quite an indictment, to say the least; yet, in the jargon of the streets, what a "mouthful."

The old man spoke as one who had been in a certain line of business for many years. He served his years of apprenticeship and then followed a business which had already been pretty well adjusted to the sphere of life. A man became a blacksmith by working in a blacksmith shop under the supervision of a man or men who already had mastered all there was to know about blacksmithing. As the old blacksmith said: "They learned the trade."

Now, it took several generations for the blacksmith trade to adjust itself along with other lines of business. But eventually it became stabilized and a man who went into the blacksmith's business had to go through about the same performances in every case. The equipment of all blacksmith shops was about the same, also.

Thus, a man working as a blacksmith, or helper, in one section of the country could fit in in another shop anywhere, because he had mastered the trade and knew all there was to know about it. But it took generations to make this possible, just as it took generations to adjust the carpenter or machinist's trade. And it will take generations to stabilize the automotive mechanic's trade.

Where Can We Get Mechanics?

To add to this, we have the complex situation arising from the fact that our factories are making automotive vehicles much faster than we can supply mechanics for maintenance on these vehicles. We might make several millions of cars a year, but we cannot make several millions of mechanics at the same time.

At the rate the industry is growing, the proportionate supply of trained and experienced men dwindles very fast and unless we take steps to educate and train others, it is difficult to see how there will be any but rough sailing in the future for many dealers.

In the main, there has not been a recognition of motor vehicle repairing as a craft. By far the greater per cent of mechanics working in automotive shops today are not skilled craftsmen. The vast majority need education. The fault that we are not farther along with the advancement of the craft lies largely with the dealer and with the large shop in position to install a proper system of training.

In most large automotive shops you will find several men who are top-notchers and whose ability as mechanics cannot be questioned. Yet these same men often are jealous of their knowledge and experience and naturally hate to have an unskilled man placed alongside them. The skilled man feels he has spent much time in learning the trade and naturally he does not feel inclined to pass along any information to a "greenhorn mechanic."

We are content to let our unskilled men go about the shop without any incentive to do good work or better their position in the organization. And when one of the men does get a promotion and the others "kid" him about wearing a white collar now, we say nothing but let the men have their fun, instead of trying to point out to them that they need not work in grease and dirt all the time and that reward awaits those mechanics who put forth effort to better themselves.

What we need today is a higher standard with which to gage the men in the shop. We need more white-collared men and boys who are not afraid to shed the white collars and shirts for khaki overalls and jumpers. The inference here is that we must have men and boys who come from the white collar class and who have the right social standing that makes them good workmen. But you say, "Where are the men or boys coming from?"

The Best Material for Shop Personnel

What about the young man out of high school who asks for a job in the shop? Doesn't he make excellent timber, if he be of the average high school type of student, for shaping into a first class mechanic, trouble shooter, tester and eventually service manager or superintendent? The industry offers vast possibilities to these young men, but they must be shown these possibilities. And, before they can be shown, we who operate

large shops especially must be sure that we have the correct perspective, especially as regards the future.

We already have said that it will take generations to get things adjusted in the automotive mechanics' trade. In other words, we must build now for the future. The immediate problem is to get the right kind of timber from which to mold the finished article.

It happens that in other lines of business, men and boys are forsaking the white collar jobs such as bookkeeping, clerking and so on and joining the ranks of the building trades, for example. It is only natural that a young man, perhaps just out of school, should look with envy upon the skilled mechanic of his own age making twice as much money as he does as clerk, stenographer or bookkeeper.

The best timber from which a dealer can make up his shop personnel consists of the hosts of young men of good education who like to work with their hands as well as their minds. Such men will make better mechanics, because, for one thing, they will raise the standard of morale of the shop. And the latter is one of the biggest jobs we have confronting us today in most large shops. There is little excuse for a mechanic remaining always just a mechanic. Just because his work often necessitates getting his hands dirty is no reason why they must remain dirty.

Take the case of a machinist. He goes to work very often in clothes that permit him to have equal social standing with the banker, lawyer or doctor. He dons a jumper or apron when at work, gets his hands dirty now and then, but he cleans up before going home, or to his lodge. One could never tell his occupation by his appearance when he is off the job. But with most automotive mechanics it is different.

They seem to think that white collars have no place in their makeup when the day's work is done. They laugh at the man who has been promoted to the job of service salesman or inspector. They poke fun at him because he wears a duster now instead of a pair of overalls. In short, what we need in the shop today is a building up of morale, so mechanics, helpers, greasehounds and washers will see the advantage of taking pride in their work and the ultimate reward that comes from faithful service.

Training System Is Wrong

The present system of hiring an unskilled mechanic and placing him alongside an experienced man who has come up through the ranks does not work out very well in most cases. The experienced man is jealous of his knowledge and is not, as a rule, willing to pass along any information which will help the man who is as yet unskilled in the craft. Certainly there should be a means whereby the skilled worker might teach the unskilled.

And, we must not overlook the fact that our high school boys, many of them, have an excellent background upon which their future as valued employees in the dealers' maintenance department, or any other department of his business, for that matter, might be built.

Our candid opinion, and we believe it is shared by service managers and dealers generally, is that, other things being equal, the young man out of high school, or who has perhaps finished but two years of high school, stands a better chance of making good in the service station or shop than the young fellow who slouches in with a cap pulled over his eye, is careless about his dress and leaves off his g's on the words running, writing, testing and so on.

The lad from high school has had training in English and mathematics. His mathematics has helped him to think logically. It has made his diction good and heaven knows if there is anything that makes a customer have faith in an organization it is being met and talked to by a man or youth who does not say "dem" and "doze" or "we ain't got none o' dem in stock."

In addition to the things mentioned above, the boy from high school has often had training in shop practice. The better class high schools have such courses. This means that the youth who finished the course possesses dexterity of hand. He will have a knowledge of welding, forging, brazing and soldering. He will know how to shape metal and wood. He understands the difference between percussion tools and cut-

ting tools. He will have had some lathe and drill press work. Drafting and the reading of blueprints will have formed part of his course.

On top of all this, we have in him a young man of good social standing who can talk intelligently to people. In short, he has the qualifications that put the stamp of approval upon him as a potential factor toward building up a high class shop personnel.

How often have we heard a service manager tell of how a promising young fellow in the shop was placed on the service floor, but "fell down" because he could not meet people. He was a good mechanic, knew how to shoot trouble and all that, but he "queered" himself when it came to meeting the public. He could not wear the white collar, so to speak.

That's where the young fellow out of high school probably has the edge on him. He may develop into a crackerjack mechanic under the right kind of supervision and then stands ready for promotion to a job of service salesman, inspector, foreman or even service manager.

A Lesson From "Uncle Sam"

The present plan of putting a large number of men into the shop under a single foreman does not work out very well in most cases. We probably have to take a lesson from the army and see if we cannot apply to our shops some of the practices of Uncle Sam. In the army, the smallest unit of men is a squad under the immediate supervision of a corporal. Then follows the section under the sergeant, the platoon under the lieutenant, the company under the captain, and so on up to the division under the command of the major-general.

Now, in case of the automotive shop, instead of having the men all working in one big room, we should put the skilled craftsmen in stalls, and have several unskilled men directly under their supervision. These skilled craftsmen would be in charge of their respective squads and all of them responsible to the foreman or shop superintendent.

Here again we would find the military training of our high school boys working to advantage. They have been used to discipline and, therefore, would readily fall into such a plan of shop operation. The right sort of leadership will do the trick. The plan would soon take care of the fellow who proves a liability rather than an asset. He would be weeded out and eventually the personnel would consist of only high class men.

There is no limit to how far the automotive mechanic can aspire. A new field, that of automotive maintenance engineering, is as yet in its infancy. There is a vast difference in the building of a product and in its maintenance. If this were not so, we should not have railway maintenance men, who certainly are of a vastly different type and have altogether different duties to perform than the men who design and build railroads and equipment.

At a recent meeting of the Washington section of the Society of Automotive Engineers, Secretary of Service H. R. Cobleigh, of the National Automobile Chamber of Commerce, presented a paper entitled "Automotive Maintenance Engineering—a New and Inviting Field." In this, the author said, among other things:

"Engineering is doing anything scientifically and efficiently as contrasted with just doing it. The definition indicates exactly the difference between service as we now know it and what it will become when it is dignified to the status of maintenance engineering. As long as we delegate the repair and upkeep of our automotive equipment to hammer-and-wrench mechanics, we will not have efficient nor satisfactory service from the owner point of view.

"If we apply to maintenance some of the same sort of engi-

neering that has been put into the other ends of the industry, the industry will continue to spin along just as wonderfully as it has in the past. The trouble is now, that it threatens to spin in one spot instead of making any progress, if we do not do something about making the ownership of motor vehicles more agreeable and economical to friend owner.

"Why should we not have engineering in the automobile operating field just as much as in railroad operation? Why has it taken automotive engineers so long to appreciate the opportunities for them in the maintenance branch of the business? Where would our railroads be today if the engineering was confined to the production of their rolling stock? It takes just as good brains and just as much talent in the personnel to maintain roadbed and rolling stock in use as it does to bring out the original equipment or lay the first track. The engineer never leaves the picture in railroad transportation and neither should he in motor transportation.

"From now on, automotive vehicles are going to be designed for more facile and economical upkeep, and the organization in the field, which has the direct contact with the motoring public, is going to work out the problem of doing this work with the least expense to the owner and to his greatest satisfaction.

"Now, as to the relative size of this service or maintenance field as compared to the production field. Well, here are the latest figures: We are producing at present around two and a half million cars and trucks a year, but there are in use eleven and three-quarter millions—a ratio of about one to five. Inasmuch as the average life of a car is six years, it means that when the dreaded saturation point is reached we will be constantly servicing about six times as many cars in a year as we produce in that time.

"A great deal will be accomplished when the element of engineering conscientiousness is injected into service, for one thing. This is a more or less abstract idea to discuss, but I think you will get what I mean when

you consider how important it is for everyone in the automobile repair business, from the engineer down to the humblest mechanic, to keep in mind his responsibility for doing everything thoroughly.

Production Efficiency in Maintenance Work

"Suppose, for example, we make a study of the execution of work in the repair shop and contrive ways and means for performing it that approach more nearly to the methods obtaining in the factory. If cars were built as inefficiently as they are overhauled, they would cost about four times as much as they do. Conversely, if they could be overhauled as efficiently as they are built, the work could be done for one-quarter its present cost.

"While this ideal may not be attainable, certainly much can be done by concentrating the work in fewer large shops so that the volume of work handled would justify the installation of labor-saving machinery.

"Education of shop personnel and the rating of mechanics are subjects well deserving the engineer's attention, for they are sadly needed. This education means developing them not only in mechanical ability but letting them understand something about the reasons for what they do and why the parts function as they do.

"The advantage of higher education for the operative is not alone that he will do a better job because he knows what is expected of the part upon which he is working, but he will actually do a cheaper job also, because he will seek to cut down the time necessary, and will develop tools that will save time and labor. It is therefore in no sense beneath the engineer to be concerned about the personnel in the service station."

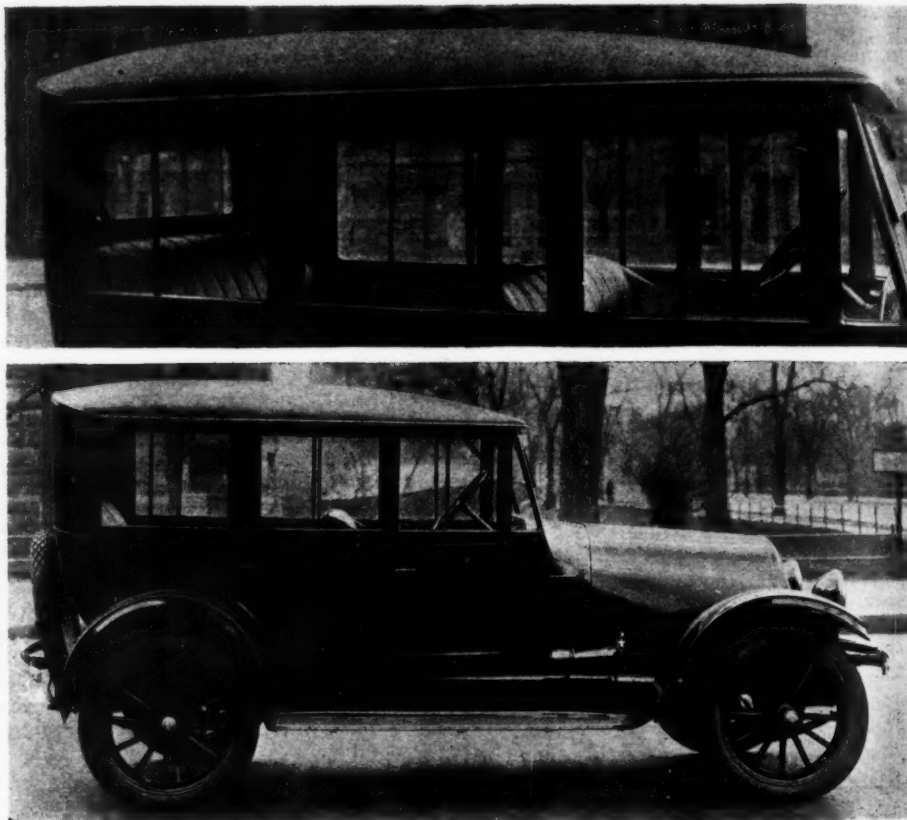
Some New Enclosed Car Models

Franklin Demi-Sedan Combines Two Cars in One

THE ever-increasing demand for enclosed car protection led Franklin designers to evolve the Demi-Sedan, a single unit type which in their opinion approached the ideal of a enclosed model for use in the inclement season and a clear vision open car for the pleasant open-driving season.

The frame structure is substantial without being heavy. In place of dropping the glass side panels, a series of divided panels, sliding horizontally, was used. In actual test on the road under all weather conditions, the sliding installation was found to have certain distinct advantages in ventilation, convenience and reliability.

In producing the Demi-Sedan design, it was deemed essential that the removable frames, when in place on the sides of the body, should attach to the doors as firmly and be as rigid in their own construction as they would be if built integral with the door. The Demi-Sedan without being in any way a departure from good coach-making practice, looks, nevertheless, like a new kind of automobile.



Jordan 4-door Brougham Displaces Old Model

THE new four-door Jordan Brougham will take the place of the old two-door brougham which the company has been making for the past seven years. The Jordan factory now is running 60 per cent of its production on enclosed cars and the four-door brougham is scheduled at the rate of 30 per day.

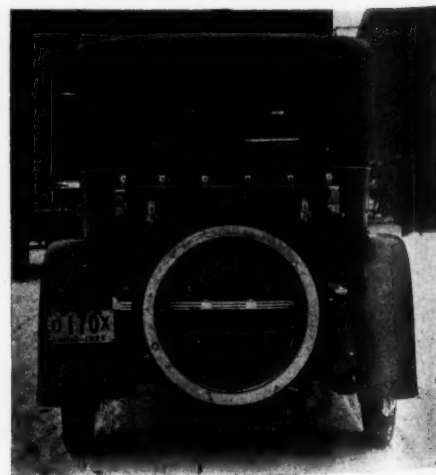
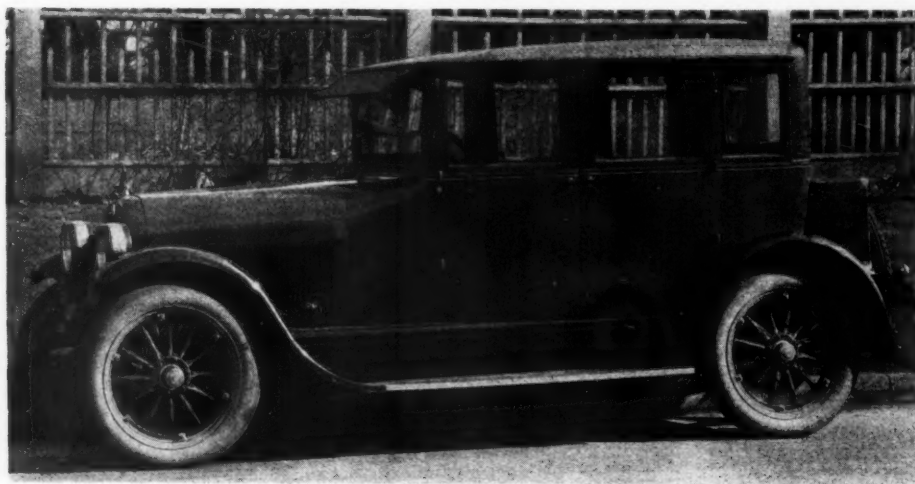
It is built on the standard Jordan chassis with capacity for five passengers, with complete trunk equipment. The price is \$2285.

The four-door brougham, which seems to be the latest thing in enclosed models, has all the advantages of the compact, light weight, intimate car, with all the capacity and comfort of the sedan, it is stated. The lines of the new car are long and low, rounded to relieve the

eye. The doors swing wide and cushions tilt to a position of relaxed ease.

The interior fittings are in flat platinum finish and the trunk has two suit cases built in to harmonize with this new type enclosed car.

The great advantage of the four-door brougham, according to Jordan, is that it relieves the passengers in the rear seat of the necessity of crawling over the people in the front seat.





Cole Suburban Shipments Under Way

DELIVERIES are now being made from the Cole factory on its new Cole Suburban. This car seats four people in the conventional seating arrangement. The color of this car is Lorraine blue, with black upper panels and sheet metal parts. The company states the new model is its finest enclosed car product thus far. The body is made of aluminum and designed to create the short coupled semi-sport appearance and yet afford the room that is demanded in modern enclosed car construction.

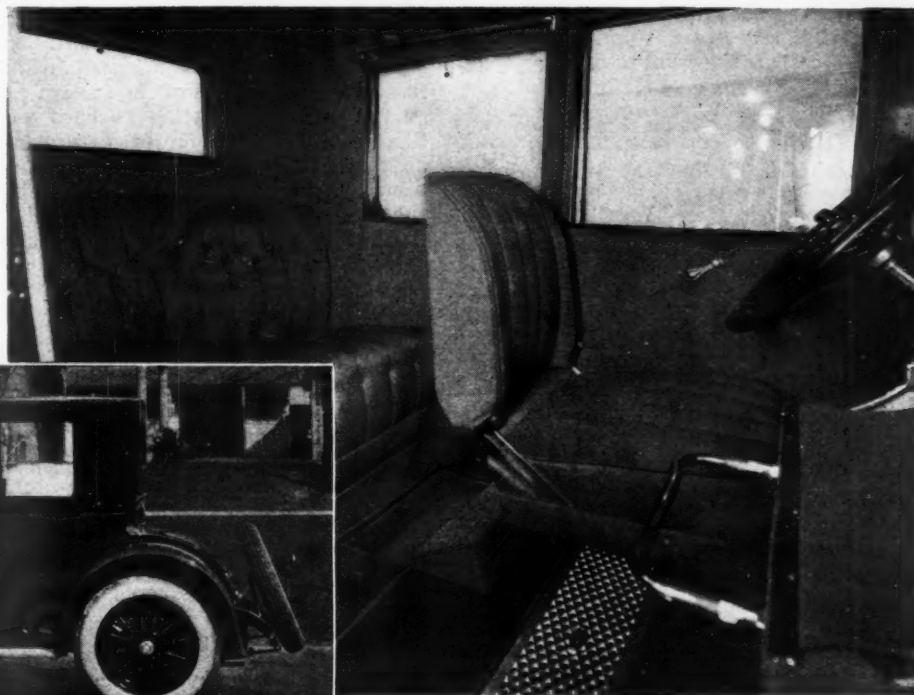
Seat Comfort Features New Winton Coupe

IN order that the passengers riding in the rear seat may secure more comfort, Winton has introduced a rather novel feature in its new five-passenger coupe. By creating a well in the floor which holds the foot rest, considerable additional space has been provided. The foot rest thus formed by the well, when not in use folds down flush with the floor. The coupe seats five passengers.

Entrance and exit from either side is made easy by doors 28 inches wide. The right front seat folds down at right angles to the floor. The driver's seat tilts forward against the steering wheel, allowing one to get into the rear seat

from the driver's side. These seats are 18 inches wide, 19 inches deep, and seats as well as back are built upon a full foundation of coiled springs and curled hair.

The rear seat is 47 inches wide and 19 inches deep, the same size as the rear seat of the seven passenger sedan, seating three people with ease. The price is \$4250.



Dan's Diary

APRIL 28—Here it is Satiday agin and I aint rote nothing in my diary this week yet. Yestiday evening I had a good job teaching a swell dame to drive which had been pretty near skard to deeth by some bird who was out of the servis stashun where she got the car.

Insted of telling her how to drive and stear backwards and how to step on the break and cluch when she gets in a tight place he spends all his time explaining the machinry and how if she thros her in reverse when she's going forward it will cost her \$43.25 for a new gear which is the flat rate at his stasun and mabe she'll need also a new drive shaft which is \$14.89 and mabe a ring gear which would be \$57, them all being flat rate prices.

This poor dame was so skard she was afraid to move anything or go anywhere for fear she would bust one of them flat rate artikles which she got when she thot she was buying a automobile.

I explains this flat rate stuff to her and tells her to forget all that this bird has said to her about bustin things cuz they dont bust very easy anyway except unless she runs into something which she wont if she remembers her throtel and break and cluch



and goes slow till her feet and hands get run in and operating smooth.

APRIL 29—I went out with that dame again she sure is getting along fine. Gess I must be some teecher. hope my girl didnt see me riding with her me thinking Gee, Heck, that would be feerce. She insists on me taking \$10 which is too much but I finally takes \$5. which will buy my girl 2 swell earrings and then I gess she wont have nothing to say if she did see me.

CORRECTION

By error the wheelbase of the Monroe touring and sedan models, illustrated on page 17 of the April 19 issue of MOTOR AGE, was given as 103 inches. This should have been 115 inches.

Lineup to Date for Indianapolis Race

CAR	COUNTRY	DRIVER	CAR	COUNTRY	DRIVER
1—Bugatti	France	Pierre de Vizcaya	11—Scheel Frontenac	U. S.	Herbert Scheel
2—Bugatti	France	Prince De Cystria*	12—Scheel Frontenac	U. S.	Not named
3—Bugatti	France	Raoul Riganti*	13—Scheel Frontenac	U. S.	Not named
4—Mercedes	Germany	Not named	14—Scheel Frontenac	U. S.	Not named
5—Mercedes	Germany	Not named	15—Packard Special	U. S.	Ralph De Palma
6—Mercedes	Germany	Not named	16—Packard Special	U. S.	Dario Resta
7—Durant Special	U. S.	James Murphy*	17—Packard Special	U. S.	Joseph Boyer
8—Durant Special	U. S.	Harry Hartz	18—Miller Special	U. S.	Thomas Milton
9—Durant Special	U. S.	Cliff Durant	19—Schmidt Special	France	Jules Goux
10—Durant Special	U. S.	Edward Hearne*			

* Not definite.

THE entry list for 1923 is significant from many points of view. This is the first year since 1915 that the big Speedway band will play the "Wacht am Rhine," which, when it was last played, proved a song of victory for the car being honored. Additional interest is attached to the race this year because the driver who worried De Palma on the 1915 occasion is to be his team mate this year. Everybody who saw the race last year will admit it was a pretty exhibition of speed, but who will ever forget the 1915 Resta Peugeot-DePalma Mercedes affair?

You'll remember that the Mercedes won, but the car wasn't worth much immediately after the contest and after De Palma put in new bearings he shelved it in favor of the Packard twin six. Resta's old Peugeot was fast enough to make it impossible to name the winner until the next to last lap. It wasn't the swan song for the old blue car, because the following year Resta drove the same bus into first place.

That old 300 inch Peugeot crossed the finish line to first place probably more times than any car that has ever been seen at Indianapolis. Its first victory dates back to the rainy day race held on the opening day of the San Francisco Exposition, and on June 26, less than a month after the defeat at Indianapolis, it established a world's 500-mile record on the Chicago speedway of 97.58 miles per hour. To clinch the argument, if you remember, an invitation race was put on at the same place some weeks afterward, but the beautifully built Packard body and carburetor on the revived Mercedes wasn't enough to give it a look in.

Resta never had any luck after he gave up the Peugeot and later, took up fancy ice skating for diversion. Recently he has gone out to the west coast which serves as a winter training camp for car and man to prepare them for the annual Hoosier Classic, which brings us to the third significant thing about this race; the three Packard entries.

Boyer Comes Back

All of the available data regarding the construction of the Packard six cylinder racers was printed in MOTOR AGE a few weeks ago and the drivers have already been named. Joe Boyer's name listed as one of the drivers is quite a surprise for it is known that he was forbidden to

compete, by certain domestic authorities. Boyer is known to be afflicted with a heavy foot and he has the honor of having driven the fastest lap in the French Grand Prix, the year that Jim Murphy introduced the name of Duesenberg over there.

Last year he was assistant starter at Indianapolis but managed to get to the track early enough before the day of the race to relieve the weight on his right foot, by taking Fetterman's Duesenberg around a few times. Judging from the performance of the foreign cars during the past year, the Packard creations have no cause for premature fear, as it is doubtful if the Bugatti's can approach the performance of the American racers. As to the Mercedes jobs it is understood that they are to be factory driven and it is doubtful whether the Lautenschlager, Seiler, Werner trio will have time to acquaint themselves with the style of driving required at Indianapolis. Mercedes cars have never failed to give a good account of themselves and, like their aviation engines, have always been noted for reliability.

Plenty of Rumors

It is also rumored that Engineer Gross of Mercedes will bring over an extra car to be held in reserve, and that all four have been especially constructed to meet Indianapolis conditions.

The same rumor has it that the cars are equipped with four cylinder engines that deliver their maximum power at 5000 revolutions. Discounting all rumor and judging from past performances it is safe to count the Mercedes entries as the most dangerous among the foreign contingent.

No one knows just now whether, or not, the famous Fiats will put in their appearance this year. The 122 inch roller bearing Fiats have been victorious in every contest entered in Europe, since the 1922 Targa Florio when they were beaten by the amateur Masseti, who handled a 300 inch Mercedes.

A car built by the Fiat organization was brought over here and campaigned during the latter part of 1921 by Pietro Bordino. It was the first all roller bearing job on the Pacific Coast and although the chassis was heavier than the 183 Duesenberg it possessed enough speed to win one distance race at over 110 miles per hour. Bordino playing a lone hand was not equal to the team work of the

Duesenberg-Miller combination and returned to Italy.

Still to be heard from are three, or four cars being built by Fred Duesenberg. It is known however, that the engines for two of these cars are in process of manufacture in the Duesenberg factory at Indianapolis, and are supposed to be ready for test about the tenth of May. Just as Harry Miller has pinned his faith on the straight eight so will Fred Duesenberg, in his new series of racers. The smaller Duesenberg engine may be equipped with 32 valves instead of the double inlet and single exhaust as used last year. The probability of the new cars being of the four valves per cylinder type is reasonable, because a 32-valve 183-inch Duesenberg was tested on the Indianapolis speedway some weeks after last year's race. The car was driven by Howard Wilcox and turned one lap at 105 miles per hour, a record for the track.

23 Years Ago This Week In MOTOR AGE

(From MOTOR AGE of May 3, 1900.)

The Auto Canal Mule

PHILADELPHIA, April 30—On Thursday last the first of the electric motors that are to displace horses on the tow-paths of the Delaware & Raritan Canal arrived at Trenton and the following day, the machine was privately tested in actual service. The "mechanical mule" is a ponderous affair, weighing several tons and resembles a "cumbersome farm wagon" as one of the Associated Press correspondents described it.

And Look at Them Now

WASHINGTON, D. C., April 28—The utility of the automobile as a means of collecting mail was amply demonstrated to local postal authorities during the past week.

Opposed Fenders for Automobiles

CHICAGO, April 30—(A reading notice under this date tells of the introduction into the city council by Alderman Blake of a bill requiring all automobiles operating on the streets of Chicago to be equipped with fenders.) The ordinance was shelved by the last council but its father, Alderman Blake, threatens to re-introduce it into the new council. It is thought, however, this bill shall never be a law.

Bill Fixit's Return

Betty Jetline Hangs a Picture, Bill Springs a Battery Selling Stunt and Hutch Brings Home His First Order

By A. H. PACKER

The First Article of This Series Published Feb. 15, 1923; Second Article, March 8, 1923.

*If yer doan tak keer
An jes hab fun
De battry dies
At de age ub one.*

*If yer watah ut reglar
When de watah am due
De battry might las'
'Till ahmos two.*

*When deys tree years gone
An de battry's dere
Its a case dats 'ceptional
Not to say rare.*



"Dat indiscretional litin' system's shur alright."

R. JOHNSON BROWN had cleaned three reflectors out of four. "Dat indiscretional litin' system's shu ahright," the porter confided to his sponge and cleaning cloths. "Jes keeps a boy humpin right smaht, doe, to keep dem fancy wash bowls clean. Bill shu raise de dickens wif me if ah doan, so ah bettah step along an clean up dat udder one, too, foh he gits here." Rufus took his sponge and cloth and put his foot where the first step of his ladder should have been. He pawed the air. The ladder was gone.

Rufus' eyes rolled, the whites glared in incipient terror.

"Mammy done tole me not buy nuffin fum dat cross eye variety stoh. Laddah mus be bewich, jes walk off when ah not lookin." Rufus' rolling eyes scanned the salesroom in a wild hope of seeing the missing ladder. There it was at the other end of the room and perched on the very top was the guilty abductor. Now her bobbed hair shook as her head nodded vigorously, then swayed gently back and forth registering doubt. Betty Jetline was on the job as well as on the ladder.

The question requiring right decision was one that even Bill could not have decided. Should the enlarged picture of Lorry Dean, the movie heartbreaker, be put on this wall or that, up near the molding or down a bit. It was a momentous question and Betty knew she must find the answer. To make a little money for working was one thing, but to get paid for fixing up things for a tea party was just too much. All the girls from the Sipa Bit a T sorority were coming down to the showroom to see her that very afternoon and Bill had told her to order what she wanted from the grocery and charge it to him.

Of course there would not be enough chairs for all the girls, but the seating capacity of the cars on the showroom floor was considerable, and there would probably be a scramble for these. A mo-

and what fun they would make possible.

"Here, Rufus," Betty said, on being discovered with the goods on her, or rather under, "hold this picture up here a minute while I take a squint at it then I'll let you have your ladder." Rufus complied, held the picture here and there until the queen of the showroom was satisfied with the location. The picture was hung, the last globe cleaned and everything was in readiness for the regular Monday morning conference.



The men of the shop were there, the Red Head was there, Charlemagne Hutchinson, Bill and last, but not least, Betty was there, ready to record the ideas presented, and giving a zest to each meeting, a reason why each man should unconsciously give the best he had for the good of the ship.

Bill opened the meeting.

"We are going to take up batteries again and, when the old ones are worn out, we are going to sell new ones to most of the users of Runwell cars, if confidence will sell them. I have not taken the time previously to tell you what all these new glass partitions and that cozy little rest room are for, but it all has to do with batteries in particular and other things in general. So that you will see the idea, we will illustrate by assuming a customer comes to the maintenance department, complaining that his starter does not work, and that the contact man on testing finds the battery is at fault.

Keeping the Owner Out of the Shop

"You all know how annoying it is to have a car owner hanging around when you are working on a job, and yet the customer has a right to know what is going on for it is his car, not ours. That is why we are trying to effect a compromise that will keep everybody happy. In most shops the customer does not want to walk around the car and be in the way, but he does want to know what is going on. We can now invite our clients into the rest room, and through the glass they can see practically as well as if they stayed in the shop.

"In the case of battery trouble the car owner will be told that a few minutes only will be required to take the battery out and test it. He can read a paper or magazine while the battery is being removed.

"As soon as the battery is out of the car it will be brought to the window



"Laddah mus be bewich; jes walk off when Ah's not lookin'."

between the shop and rest room and the high rate discharge tester will be used and the readings of the meters explained. A good battery will also be available so that the difference in its behavior may be shown to the customer. Then when the car owner has been shown that his battery is in some way defective, he will be asked to wait just a few minutes more, while his battery is opened for inspection.

"You will note that we have the battery steamer and the drill press both arranged where the customer can see what is going on. Everything in plain sight. No chance for us to slip anything over or palm off some other battery in making the tests, and what is more important, no chance for the customer to think we are doing so. While the steamer is doing its work, the posts will be drilled off, and the education the customer gets will keep making our job easier.

"In a few minutes the battery will be ready to have the elements pulled out of the jars and then the condition of the plates and separators can be shown. Sulphated plates, rotted separators, disintegrated positives, all such conditions can be explained.

"This is also an opportunity to tell the car owner those things that affect the life of a battery. He should be told the bad effect of allowing the plates to get dry, the ruinous action that takes place when a battery is left in a discharged condition, and in winter the danger of having a discharged battery freeze.

"Arguments and inharmonious relations with customers are invariably due to misunderstandings, and the more instruction we can give, the more confidence we can create.

"Both in the shop and in our selling we must use care to present the fact

that the battery is a well made mechanical device and that the work that it does will be measured by the care it receives. Car owners should be encouraged to come to us frequently, and especially in the fall and spring. At this season of the year we can reduce the charging rate so as to give the battery as near as possible the right amount of current.

"Now," continued Bill, "I believe Hutch has some good news to tell us."

"Guess I have," said Hutch. "It was sure good news to me. I had been chasing around here and there calling on all the grouches in seven counties more or less, and I was having a hard time to keep smiling. Had been doing that for two or three weeks. Then one day I happened to be going by Fraser's old place, one of the first places I had called on. Mr. Fraser saw me passing and called out for me to come in. I came, and guess what she wanted.

"Said Hiram Billings over on the Stubbs road wanted a Runwell car. She had told him how we fixed them up and had the old car running just like it used to, and he said if Bill was selling Runwell cars and had a bunch like that in the shop, he would take a chance, too. Pretty good, I thought, from a hard-boiled old crab that no one else had ever been able to approach.

"That's how I came to go over there, and with the old boy feeling right, it wasn't any harder than selling a can of peas down at the old grocery. Our campaign of selling the old owners first is certainly making itself felt. We must keep up the good work and the shop will sell the cars."

A smile of appreciation went around the group at the conference. Each one knew that the sale belonged to them as well as to Hutch, for the good work of the shop had made it possible.

"After the good news," said Bill, "we will feel a little more like working again, but before we go back to the job I have a few additional pointers to bring out about batteries. One question you may be asked is how long a battery ought to last. It's a hard question to answer. The best thing we can do is to say that the life depends to a great extent on the treatment that the battery gets.

The Battery Should Live Until it Dies

"The batteries we sell are made of the best materials obtainable, and in the hands of the average owner will last from one to two years. Our guarantee will not be based upon a definite time, but on the general reputation we build up and on the "show me" equipment we have for explaining to the customer exactly what the conditions are in his battery and what has caused them.

"One thing you boys want to watch out for is to keep impurities out of a battery. Iron, for example, causes trouble, so never make the mistake of sticking a screwdriver in the battery to see how much electrolyte there is in it. Then acetic acid, the kind that's in vinegar, if

it gets into a battery, will rot away the lead posts and connecting straps in a short time. This acid is found in wood, and that is why we get the best separators we can buy. We do not want to take chances with poor stuff, perhaps poorly treated, and possibly containing traces of this acid.

"While we have alternating current and rectifiers in our shop, still I want to say something about charging from direct current, so you boys will know just what is happening when a battery is on charge, either on the bench or when in the car. The discharge of a battery might be compared to the running down of a weight in those old-fashioned clocks that used a weight instead of a spring. To wind them up, you have to raise the weight, which is just the reverse of what was happening when the clock was running down.

Charging the Battery Is the Discharge Process Reversed

"Also in the battery we have to reverse the process, and while the current came out of the positive terminal on discharge, it must be forced back in at the positive post when on charge. This means that there must be a voltage or electrical pressure greater than that of the battery in order to accomplish this result.

"The most common direct current available is known as 110-volt current, and for emergency use or occasional charging, a bank of lamps can be used as a resistance. That naturally brings up the question as to why a resistance in charging from 110 volts is necessary, and to understand that point we have to know how to figure electric currents. The rule, however, is rather simple.

"The voltage is the electrical pressure that pushes the current along the wire or other conductor or carrier of elec-



Betty Jetline was on the job as well as on the ladder.

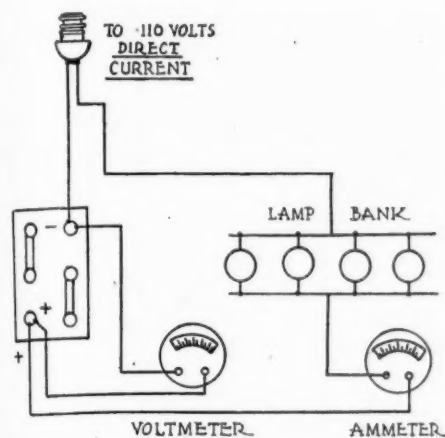


Fig. 1

Circuits for charging batteries on 110 volts D. C.

tricity. The nature of the wire, its size, length, material and temperature affect the resistance or opposition to flow of current, much as the rust and scale in a pipe affect the flow of water. The pressure we measure in volts with a voltmeter, and the resistance we measure in ohms.

"Any piece of wire will have a definite resistance in ohms just as it has a definite length in feet, or a definite weight, and from wiring tables we can find what the resistance of a certain piece of wire may be. Copper wire, for example, which is about one-tenth of an inch in diameter and 1,000 feet long, has a resistance of one ohm. Now we come to the point of figuring from the nature of the circuit and the resistance just how much current will flow.

"This is the point where I am interested and you should be if you care much about your job.

"If, for example, you do not know anything about estimating the amount of current that will flow, and you connect a good 10-ampere meter in a circuit where the current is to be 300 amperes, the meter is going to go up in smoke, and the smoke is not the only thing that will go up in the air. Red did that little trick when he first came to work for me, and I chased him a block, trying to brain him with a milk bottle; so you see lack of knowledge is dangerous in more ways than one."

Bill's listeners smiled, but at the same time they got the point.

"Now we will take a look at a sketch which I have called Fig. 1 and we will figure the nature of the resistance which

is made up of the four lamps in the lamp bank. Each one of these is an old-fashioned 16-candlepower carbon lamp, not much good for lighting, but all right for wasting current, and that's exactly what we are using them for. Each one used by itself, right across the 110-volt circuit, would use one-half ampere, so we figure the resistance of each must have been 220 ohms, in order to be able to divide 110 volts by it and get one-half.

"Now with four of these lamps side by side we have four times the chance for the current to get through, so we have one-fourth the opposition or resistance to flow. That means that all four lamps considered together and connected side by side have a resistance of 55 ohms, which is one-fourth of 220.

"Now if these lamps as a unit were connected across 110 volts, we would have a current flowing of two amperes, for 110 divided by 55 equals 2. Here is the point, however, where the average man gets stuck, he doesn't know how to figure it when there is a battery being charged as shown in Fig. 1. It is simple, however, like everything else, when you know how.

"Instead of taking 110 volts as the voltage with which to figure, you subtract from it the battery voltage. That means at the start that we have 104 volts acting, and this electrical pressure, if we hunted for it with a voltmeter, would be found across the lamp bank. That means the lamps will be slightly dim. Then to find the current, we divide 104 by 55 and find it to be about 1.9 amperes instead of 2 amperes.

Paying for Current Thrown Away

"The worst part of this method of charging batteries is the cost of the current that is thrown away. The total watts we pay for is found by multiplying the total voltage by the current, so that in this case we pay for 110 times 2, or 220 watts. The watts we use equal 6 volts times 2 amperes or 12, and the watts thrown away in the lamps equal 104 times 2, or 208. Thus we are throwing away 208 watts out of every 220.

"The only way to beat this condition is to have a string of fourteen batteries instead of one, and of course the 2-ampere rate we used in the figures is much too low for average charging requirements. To get a picture of what will happen, I have figured out the currents and other details for a condition where various numbers of batteries are to be

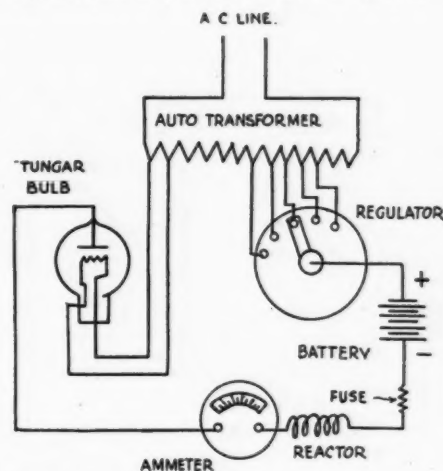
No. of 6VOLT BATTERIES	BATTERY VOLTS AT START	BATTERY VOLTS AT FINISH	AMPERES AT START	VOLTS AT LAMPS 110 VOLTS MINUS BAT. VOLTS		RESISTANCE TO ALLOW 6 AMPS AT START	CURRENT AT FINISH WITH THIS RESISTANCE
				START	FINISH		
1	6	7.5	6	104	102.5	17.4	5.9
5	30	37.5	6	80	72.5	13.3	5.45
10	60	75.0	6	50	35	8.3	4.2
14	84	112.0	6	24	5	4.3	1.15

Fig. 2

Resistance needed for charging batteries on 110 volts D. C.

charged, and the results are shown in the table given in Fig. 2.

"The first column gives the number of 6 volt batteries on charge at the same time. The second column gives the total voltage of these batteries. The third column gives the voltage we will get at the battery when it is fully charged, for a 6 volt battery will show 7.5 or so when fully charged, and the charging current still flowing. We have arbitrarily assumed that we want a charging current of 6 amperes at the start and



METHOD OF CONTROLLING CHARGE RATE IN TUNGAR RECTIFIER

Fig. 3

General nature of the circuits of a Tungar rectifier used for charging batteries from alternating current

have figured what the resistance should be.

"In the case where ten 6 volt batteries are on at the same time, we subtract 60 from 110 volts and find 50 volts acting. Then dividing this voltage by the current of 6 amperes which we wish to have we discover that 8.3 ohms would be the right resistance. Now using lamp bulbs of 220 ohms resistance we would require a great number, in fact, twenty-six or twenty-seven bulbs would be necessary and for use with the fourteen batteries an even greater number would be required.

"The answer is that for charging in this way, a rheostat is used, and it is adjustable to get any current desired.

"When we come to the question of cost, we find that in most cases an 80 ampere hour battery will require at least 50 per cent more charging than would be indicated by its rating. This is due to the fact that the average battery we get is not only discharged but somewhat sulphated so that its efficiency is low. Our 6 ampere charge will then have to be continued for perhaps 20 hours or more.

"The cost of charging current will then be determined by multiplying the volts by amperes and hours to get watt hours. This would be 110 times 6 times 20, or 13,200 watts, or 13.2 kilowatts.

"Then if we know what the local electric light company is going to charge us for current, we know that part of our charging cost. At ten cents per K. W. H. we would be paying \$1.32 for the cur-

(Continued on page 23)



Headquarters of the H. O. Harrison Company, Hudson and Essex dealers, in San Francisco, where the service-salesman system described in the accompanying article has been installed with excellent results

Selling Maintenance and New Cars in the Service Department

A San Francisco Dealer Averages Four New Car Sales a Week, and Greatly Increased Equipment Business Through Special Salesmen on the Floor of Repair Department

By H. H. DUNN

SELLING maintenance as a regular line in the service department, but altogether apart from the service men and the repair mechanics, has been given a thorough trial by the H. O. Harrison Co., at its headquarters in San Francisco, with such good results that the corporation also has put on duty two salesmen for new cars in the repair department. These salesmen are now averaging sales of four new cars a week, without ever leaving the service and repair department, and the increase in the sales of equipment, accessories and repairs has been marked, due to the presence in these departments of men who are trained, not so much to make repairs and install equipment, as to sell needed repairs, equipment and new automobiles.

"Preventive Service Men"

The Harrison company maintains, outside its offices, two men who are constantly in touch with the owners of Hudson and Essex cars, which the company distributes in this territory. This pair, known as "preventive service men," teach the new buyer how to get the most out of his car, how to drive it, how to care for it, how to keep down maintenance and operation costs, and then tell him when and what repairs he needs.

These men are not mechanics; they make no repairs they merely are men who have been mechanics, who know the automobiles in question, and who have been successful salesmen on the floor. They keep the customer satisfied, so that he sends his friends as prospects to the Harrison company; so that, when he needs a new car, he buys it of the Harrison company; and so that, when repairs or overhauling have to be done, it is the Harrison repair shop that gets the job.

In a way, this is selling maintenance outside the job. Indirectly, the success of the preventive service men led to the placing in the Harrison service department of trained salesmen to sell maintenance to the motorist; to tell him just what he needed, what it would cost, and to endeavor to get him to have such work done as would keep his car in the best of condition, lower his costs of operation, and continue him the satisfied customer he is when the preventive service men outside get through with him. I should not have said "get through with him," for the Harrison preventive service never ends so long as the motorist has a Hudson or an Essex. These preventive service men are still aiding owners who bought their cars in 1918, 1919, 1920, and on down to the present

month, for the service begins immediately the owner drives out of the store.

Thus, the first salesman, on the showroom floor, the preventive service man, the service station men, the repair shop mechanics, and the salesmen stationed in the repair shop to sell either maintenance, equipment or new cars, are all linked together in an endless chain, drawing steadily into the office of the sales manager a constantly increasing volume of sales of equipment, service and cars.

The forging of this chain was not one man's idea; it is the result of a number of ideas, each developing from something done before. Much of the fundamental plan for preventive service is accredited to B. M. Taylor, assistant general manager of the H. O. Harrison Co., but almost all the heads of departments have had a hand in improving the whole system, which is now operating smoothly and efficiently under the hand of Roy B. Alexander, sales manager.

Selling in Every Department

"We are making a sales department out of every department in the business," Mr. Alexander explained to me. "There is no reason that cars should not be sold elsewhere than in the showroom; there is nothing to hinder the sale of equip-

ment and maintenance in places other than the repair shop; in fact, there is no handicap to selling service, maintenance, equipment, and even new cars, right on the street, if every man in the force is on the job every minute of his time. Our preventive service men, employed and put on the street in their own cars for the convenience and training of buyers of Hudson and Essex cars, of course sell maintenance. In fact, they sell equipment, they sell repairs, and, sometimes, indirectly, they sell new automobiles. In addition, they bring and send in a tremendous number of new prospects—for the satisfied customer is the best provider of prospects in the business, and he always sends them to the man from whom he bought the car with which he is satisfied. I sometimes think that two-thirds of the automobile dealer's business depends on the maintenance of a friendly attitude in the mind of the man who has bought a car from that dealer.

It Pays to Get the Best Men

"Now the preventive service man suggests to the car owner such repairs, overhauling or equipment as he may need. That owner, ninety-nine times out of a hundred, brings his Hudson or his Essex to our shop to be repaired, overhauled or to have certain equipment installed. We found that here was an opportunity for many sales, provided real salesmen were put in these departments. We picked out three of our best salesmen, men who knew the inside of the cars they sold as well as the outside, and men of good address. We put them in the service and repair departments, with orders to do nothing but sell equipment, maintenance and new cars.

"Our service superintendent, by the way, is a high-priced factory man, and let me say here that it pays to get the best-trained man you can buy for the head of your service department. Charge

for your service all it is worth, but give every customer one hundred cents' worth of service, time, labor and knowledge for every dollar he gives you.

Why Service Department Salesmen?

"When the car owner drives into our service station and repair shop he is greeted by a well-dressed salesman—not a mechanic in greasy overalls—who learns what is wanted, calls the superintendent, also well dressed, and the three go into every detail of the work the owner thinks he wants done. Sometimes—and not rarely—the owner needs other work on his car much more than he needs the work which he ordered when he came in. All this is explained to him; he feels that the firm has an interest in him, and more often than not, both jobs are taken on at once. If the owner insists on the first job, nothing more is said to him about it, and exactly what he wants is done. There is such a thing as overselling a man.

"While the owner is waiting for his car, the salesman discusses cars, equipment, maintenance and service with him. The mechanic could not do this, the head of the service department would not have time to do it; but the salesman does it, and our experience has been that, in about seven out of ten cases, he makes a sale of some kind. This seems to be a high percentage, but it is borne out by the records. In car sales alone, these salesmen in the service department have been averaging four new cars a week for some time. When a man brings in his car for general rebuilding, there is the time to sell him a new car, while he has to wait for a week or ten days for the old car. In many instances the proper kind of selling talk will leave the used car with us and send the former owner of that car out in a new Hudson or Essex.

"In selling maintenance, however, the traveling preventive service men prob-



H. O. Harrison, president and general manager of the H. O. Harrison Company, Hudson and Essex distributors, San Francisco, California

ably are the most productive, since they are with the owner when he most needs equipment and maintenance."

Another thing which Alexander and the other officials of the Harrison company consider very important in this placing of salesmen in the service station is that it has eliminated the rough edges between the repair shop and the sales and showroom. The average man in the service station thinks the salesman is a loafer with nothing to do but dress up and drive a car around town. The average salesman considers the service and repair man merely as a laborer, who does what he is told to do and lets it go at that. The placing of the salesmen there gives both salesman and mechanic a chance to learn the other fellow's problems and to realize that neither has the soft job the other believed he had.

The Flat Rate Makes Sales

A thing which is making the sale of maintenance easier for the salesmen in the Harrison company is that a flat rate for service on the Hudson and Essex has been installed, with about 100 operations on both cars. This is a standardized service established by the firm, irrespective of the factory, and it has helped materially in sales, since the buyer now knows, so long as he is in Harrison territory, just what the upkeep of his car will be. It also has helped in the sale of equipment and in the selling of maintenance, since there is a well-known flat rate for every operation, as well as for all equipment. But the Harrison company considers the placing of maintenance and new-car salesmen in the service department one of the most successful merchandising steps it has taken in recent years.



Salesmen in the repair department "Ask 'Em to Buy" at every opportunity. The result has been a number of sales of new cars from that department, and the gathering together of a large number of prospects for cars at a later date. Equipment also is sold in the same way

Jordan Factory Assumes Used Car Responsibility

Cleveland Manufacturer Announces Plan to Rebuild and Price Used Cars Nationally in His Own Dealer Organization

EDWARD S. Jordan on behalf of the Jordan Motor Car Co., is answering a much discussed question. The question is:

"Is the used car a manufacturer's problem?"

"Yes" is Jordan's answer.

We are interested in the outcome.

Jordan has made his answer in a series of advertisements published in Motor AGE, some other automobile business papers and a series of advertisements that will shortly appear in general mediums. This answer tells how Jordan dealers will sell used Jordan cars. The plan becomes effective May 15 and beginning on that date, every used Jordan car in the hands of Jordan dealers will be reconditioned by the dealer according to a standard fixed by the Jordan factory. After the car is reconditioned, a report is made to the factory, a dated metal plate will be issued for that car and it will be priced at the factory. To account for freight charges, six price zones have been erected.

A Jordan car with this metal plate, which has been registered, represents a direct obligation of the Jordan dealer and factory, just as clearly as does a new car. This plate guarantees to the purchaser that the car has been rebuilt in accordance with the national Jordan policy to which the Jordan dealers have subscribed.

"Four dominant and fundamental facts determined us to inaugurate this policy," said Jordan, president of the Jordan Company.

"The Jordan car has a very high second hand valuation, and the purchaser of the Jordan which has seen service in the hands of an owner is entitled to receive the same assurance of continued service and the same proof of value as the man who buys a brand new Jordan.

"That is the most important thing.

"Second, the present owners of Jordans have a right to know what depreciation they may expect to take on their Jordan cars if they keep them in the best possible condition while in their possession.

"They also have a right to learn what will be the penalty of abuse in case they do not help maintain the high value of the Jordan through careful attention to the care of the car while in their possession.

"Third, the dealer selling the Jordan must be encouraged to protect his own good name by putting every Jordan car, whether new or used, in such condition before resale that it will continue to build up his reputation in the town in which he does business.

"Fourth, we believe that the ultimate success of every company in this busi-



This metal plate will be issued by the Jordan company upon proof by the dealer that he has complied with the standard regulations, and it will be attached to the forward dash underneath the hood, just above the starting motor

ness will depend not upon the number of new cars which the factory ships at random to dealers here, there and everywhere, but the number of owners who find in the new and old Jordans that quality of service which gives a man dollar for dollar value."

In a further discussion of this plan Jordan says to his dealers:

"The Jordan Company realized that your success in selling depends absolutely upon the service that the second owner of the Jordan car receives, as well as the first owner. There is only one way this can be assured. That is by the inauguration of a standard national rebuilding, pricing advertising and service policy."

Again in discussing this plan, Jordan says some things that apply to used car policies generally with considerable directness, although he applies them only to the Jordan cars. This is a part of the discussion:

"Good dealers have always stood behind used Jordans, but they have not done it in the proper way, and they have never before had the cooperation of the factory through national advertising.

"Some dealers have followed the policy of telling the man when he bought the car that they would stand behind it. Then they spent as little money as possible on the car with the idea of selling it at the lowest possible price.

"If you want to know how this policy might work if we adopted it at the factory in connection with production and sale of new cars, just turn it over in your mind. The Jordan Company would last

about twelve months in this business, or until the public found out that we were a bunch of fools and crooks.

"That idea, which has been adopted by some dealers in our own organization, is so silly and so impossible that if anyone ever suggests it to us again we will feel nothing but pity for his ignorance.

"When a car was sold in this way, the foxy dealer thought that by the expenditure of a little money he could satisfy the owner. It always costs that dealer more in the end in actual dollars and cents than he could see on his books. But in his utter blindness he could not see the many dollars and the many sales that he lost through deceiving that one owner.

"We are making this strong because the policy is entirely wrong and cannot be tolerated in the Jordan organization in the future."

The interesting thing about the Jordan plan is that it makes it a fact that once a Jordan car, always a Jordan car.

Heretofore it has seemed that some factories were as anxious as possible to disown as many cars as possible after they were sold. Some dealers apparently are not interested even in the short term guarantee that goes with all cars and certainly a great many dealers tried to forget about the owners.

This Jordan plan is calculated to keep the owner in touch with the Jordan organization from first to last.

Among other interesting developments will be the relation of the prices fixed with those now published on the used car guide lists. In this connection, Jordan says in his discussion:

"Dealer associations throughout the country have been holding meetings in an effort to fix prices on second hand cars.

"They are trying to do an impossible thing.

"Prices on merchandise are either fixed by the business man who knows how to run his business, or they are determined entirely by the supply and demand."

Have you any maintenance problems? If not, you are in luck, but the chances are that you have. If so, a letter to The Readers' Clearing House will help you solve them. But first turn over to pages 42 to 47 and see if some other fellow has not had the same sort of trouble. The questions cover a lot of subjects, all the way from constant potential charging systems to balancing connecting rods.

Pressure Regulated, Forced Feed Lubrication

Variable Conditions of Automobile Engine Operation and the Forced Feed Lubricating System with Pressure Regulated in Proportion to the Load, as Used in a Number of Automobile Engines

By L. T. KNOCKE

AN AUTOMOBILE engine, unlike many other prime movers such as electric motors, and steam engines, is required to work under changing conditions of temperature, load, and speed that vary over a wide range of values. This situation, together with the matter of crankcase oil dilution makes the problem of providing a completely satisfactory lubricating system, a rather difficult one.

The engine must be properly supplied with lubricating oil so that the moving parts do not score, cut, or wear appreciably, and so that the work done in overcoming the engine's friction is a minimum. On the other hand, if too much oil is thrown into the cylinder barrels the formation of carbon, the fouling of spark plugs, and other resultant evils will follow quickly.

Load and Speed Conditions

A graphic picture of the various conditions of load and speed under which an automobile engine may operate is shown in Fig. 1. OA represents a typical brake horsepower curve of an automobile engine, peaking at 3,000 R. P. M. The curve is extended to 4,000 R. P. M. It is evident that an engine propelling a car may operate under an infinite number of combinations of load and speed, as any point

in the area OAB represents one of these combinations.

Under average driving conditions, however, the range is considerably reduced and may be thought of as contained in the area 0-2-3-4-1. A point on OA such as 2, 5, and 6 represents wide open throttle or 100 per cent load, while a point on OB such as 1 or 7 represents an idling condition or no load. All points between OA and OB such as 8, 3, or 4 represent fractional loads. The height of the point above the line OB divided by the entire height of the line measured from OB to OA gives the fractional load value of the point. Thus point 8 represents an engine speed of 3,000 R. P. M., a car speed of 60 miles per hour, and an engine load of power output equal to 2/5 or 40 per cent of the maximum power at that speed.

Consider points 2 and 4 representing an engine speed of 1,500 R. P. M. and a car speed of 30 miles per hour. At 4 the engine is operating at 20 per cent full power. An automobile traveling along a level concrete road and assisted somewhat by a favorable wind would require approximately this percentage of the engine's full power. At point 2 the engine is operating at 100 per cent load or full power. This condition can exist when the car is ascending a rather steep hill.

In each of the above cases it is understood that the engine is in high gear.

An amount of oil thrown from the connecting rods into the cylinder barrels of the engine suitable for operation under conditions of point 2, is entirely too much for the conditions corresponding to 4. When the engine is operating at point 4 the average temperature and pressure in the combustion space is low, and during the suction stroke a comparatively high vacuum exists. These conditions cause a correspondingly greater amount of oil to pass by the pistons and rings and enter the combustion space heavy or full loads. In addition, as the combustion space temperature is low the oil instead of being burned is reduced to carbon and adheres to the top of the piston and the walls of the combustion space. Under conditions of point 2 there is less tendency for the oil to enter the combustion chamber, and further, less possibility of what does enter to form carbon.

It appears that with the proper throw-off of oil to the cylinder barrels to suit the conditions of 2, a reduced throw-off is required to satisfy the conditions of 4. The bearing pressures and side thrust of the piston on the cylinder wall are much greater under the conditions of 2 than 4, and consequently more oil pressure and throw-off are needed. The throw-off from the connecting rods to the cylinder walls and pistons must increase with the power output of the engine.

If the combined inertia and centrifugal forces of the piston and connecting rod acting on the crank pin are plotted for one revolution, see Fig. 2, it will become plain that the line of action of the combined forces will lie along the line OC, swinging slightly through the rather small angle D. The connecting rod bushing is thrust against the inner surface of the crank pin at all positions and speeds. (While this statement is not true for the first portion of the explosion stroke, it applies to the balance of the cycle, and may be accepted as applying in general.) This direction of thrust of the power end of the connecting rod is further indicated by the fact that worn crank pins are out of round and undersize on the diameter OC. The drawing shows exaggerated clearance on the side opposite to the thrust side.

By locating the small radial oil hold in the crank pin in approximately the position shown in Fig. 2, adjacent to the

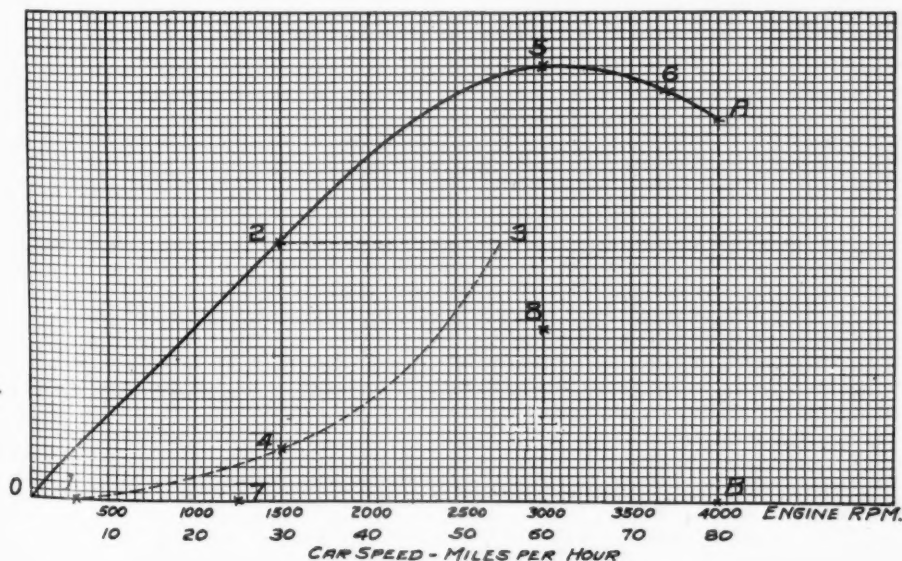


FIG. 1

Graphic presentation of the various conditions of load and speed under which an automobile engine operates. The curve OA shows a typical brake horsepower curve

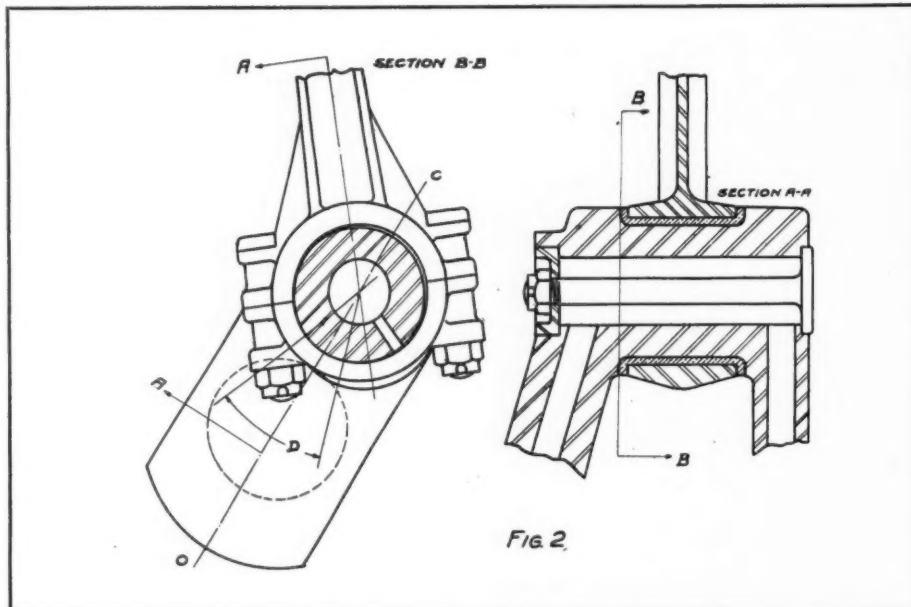


Diagram showing the action of the combined inertia and centrifugal forces of the piston and connecting rod on the crankpin bearing, with respect to the location of the radial oil hole which communicates with the hollow crankshaft

side of thrust, sufficient oil will flow into the bearing, and after filling the clearance space, be thrown out at the thrust faces of the bearing to supply the piston, rings, and pin. Changing the location of the hole by rotating it in a counter clockwise direction toward the line OC increases the throw-off.

Supplying the bearing with oil under pressure through the oil hole as shown near the area of maximum bearing pressure aids materially in maintaining the oil film and permits engine operation at high speeds and loads.

Even though slight bearing wear occurs in the course of time, the throw-off to the cylinder walls remains constant due to the fact that the rod bushing is pressing on the inner side of the crank pin surface in which the oil hole is located.

Big Capacity Pump Needed

As oil grooves, shims, and reliefs are absent in this construction, it is necessary for the oil emerging from the oil hole, which is located at the center of the bearing in the longitudinal view, to completely cover the bearing surface before it can escape at the thrust flanges.

The pressure regulated, forced feed lubricating system in conjunction with the engine consists of a crankshaft drilled completely from end to end so that the oil delivered to it by the pump can flow through it in sufficiently large quantities to effect some cooling of the bearings.

An oil pump of liberal capacity is required for a lubricating system of this type. It is advantageous to mount the pump in an accessible position and so that a quantity of oil will be trapped in at times to insure priming and immediate operation when starting. The pump can discharge only as much oil as flows into its inlet located at the bottom of the oil pan. Consequently any provisions made to assist the oil in flowing into the pump inlet, such as the use

of a large screen, or placing an air tight housing over the upper portion of the screen, are advisable. This point is particularly significant in starting in cold weather when the oil in the pan is viscous, and some little time may be required to establish circulation.

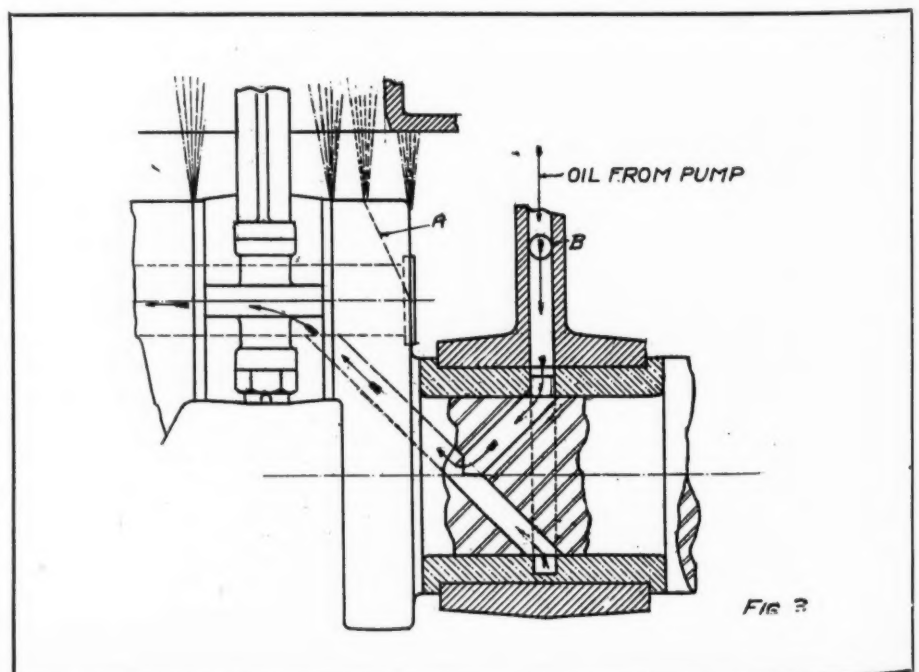
The oil from the pump is forced into an annular groove in the rear bearing, a small portion of it serves to lubricate the bearing and the balance passes into the two holes in the crank shaft which register with the groove. Refer to Fig. 3 which shows a sectional view of the rear main bearing, an adjoining connecting rod, and a portion of the crankshaft and cylinder barrel. The pressure

required to force the oil into the rotating crankshaft will vary from a few pounds at low speeds to about 25 pounds at high speeds, depending, of course, on clearance, oil viscosity and velocity, size of passage, etc. A cross hole indicated by B supplies the rear camshaft bearing with pressure lubrication.

After entering the crankshaft, the oil flows through the hole in the cheek in the direction indicated by the arrows and into the large hole in the crank pin. The connecting rod bearing is lubricated by means of the small radial hole shown in Fig. 2. The oil thrown from the thrust faces of the connecting rod bearing, as indicated in Fig. 3, to the cylinder walls and piston serves to lubricate these parts including the pin and rings.

In some instances the piston pin is supplied with pressure lubrication by means of a tube securely fastened to the web of the I section of the rod. One end of the tube registers with the radial oil hole in the crank pin and the other is opened to the piston pin bearing. The duration of register of the radial hole in the crank pin with the tube is but a few degrees of rotations, but by placing a groove in the bushing in line with the holes the time of oil pressure application to the piston pin bearing can be increased and if desired made continuous.

It is desirable particularly in six cylinder engines to shape the crankshaft cheeks adjoining the main bearings so that oil leaking from the main bearings will not be thrown into the cylinder barrels. Inasmuch as each barrel is supplied with oil by its particular connecting rod, this occurrence would result in an over oiling of cylinders 1, 3, 4, and 6. Referring to Fig. 3, it will be noticed that if the crankshaft cheek were shaped as indicated by the dotted line A, oil



It is desirable especially in six-cylinder engines to shape the crankshaft cheeks adjoining the main bearings so oil will not be thrown from them into the cylinder barrels. The dotted line A shows how oil would be thrown into the cylinder if the cheek were thus shaped

would be thrown into the cylinder barrel instead of alongside of it as should be the case.

Cleaning Oil Centrifugally

Referring to Fig. 2, the large hole in the crank pin serves as a centrifugal separator in cleaning the oil, and the construction should be such that the enclosing means can be readily removed and any accumulation of sediment cleaned out. While with the proper use of oil screens in the oil filler opening and around the oil inlet to the pump in the pan, no extensive deposit of dirt would be expected to form in the large holes in the crank pin, yet when the engine is pulled down for overhauling it is without doubt desirable to inspect and if necessary, clean this space.

The oil, flowing through the crankshaft, provides the remaining connecting rod bearings, cylinder walls, pistons, pins, and rings with lubrication in the manner described above. The center main bearing is, or are if several, oiled by a radial oil hole, in a manner similar to that of the connecting rod bearings. The center camshaft bearing is supplied with oil through a drilled hole communicating with the radial hole in the center main bearing, and the oil pressure application may be continuous or intermittent.

The oil, with the exception of the comparatively small amount thrown from the connecting rods and main bearings, after passing through the shaft, flows out into the annular groove in the front main bearing as shown in Fig. 4. The oil then passes on as indicated by the arrows, lubricates the front camshaft bearing through hole A, and flows through the regulator, onto the gears, and down to the oil sump in the pan.

The regulator consists of a tapered plunger which by moving downward into the hole as shown restricts the oil passage and causes the pressure in the lubricating system to increase. The plunger is actuated through levers and links by the carburetor throttle, or equipped with a light piston is controlled by the vacuum in the intake manifold. In either case the pressure is varied in proportion to the power output of the engine.

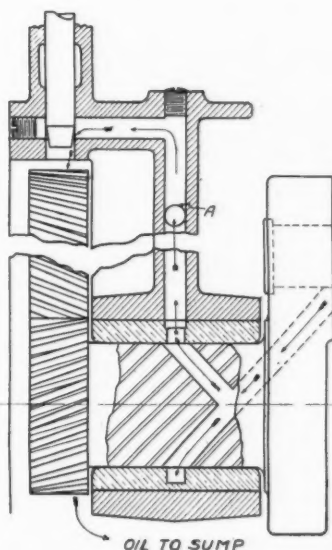


Fig. 4

This shows how the oil travels after it leaves the front main bearing. The plunger at the top of the diagram regulates the pressure and is connected by suitable linkage to the throttle

When the engine is idling or running light the regulator is open and the escape of oil from the crankshaft is unrestricted. The oil pressure in the shaft is but a pound or two and the throw-off from the rods is proportionally low. When the engine is operating at full load the regulator is partially closed, the oil pressure in the shaft is high, about 35 pounds, and the oil thrown to the cylinder walls is increased, while that flowing through the regulator and on the timing gears is reduced. The oil pressure at the pump is about 50 pounds, and a safety valve, preferably located near the pump, is set to blow off at a slightly higher figure.

In the case of an overheated valve construction an oil tube is in some cases used to carry oil to the hollow rocker arm shafts that constitute the rocker arm bearings. In addition, the oil may be led through a passage in the rocker arm to the drilled adjusting ball screw and seat, and thence through the hollow push rod and tappet, leaving the tappet

through a hole in the center of its face and pouring on to the rotating cam.

The pressure lubrication of all wearing parts of the overhead valve operating mechanism is no doubt very desirable as it materially assists in quieting the sound incidentals to the taking up of clearances as the cam begins to lift, as well as supplying a cushioning effect at the closing of the valve. In addition, the wear of the many contacting surfaces is reduced to a minimum, and with a quiet adjustment once made, it will be maintained for a long period of time.

In the case of either an L-head engine or an overhead camshaft engine, the camshaft may be drilled lengthwise and connecting oil holes drilled in the cams to provide lubrication for the cam surface and the valve lifter face.

The use of the forced feed lubricating system makes it a simple matter to supply all bearings with pressure lubrication regardless of the location, and thereby eliminate the use of oil cups or other external means of lubrication that are apt to be neglected.

In order to maintain an oil film in the bearings and thereby prevent actual metal to metal contact, the surface of the bushings are perfect cylinders as regards the absence of oil grooves and reliefs. No shims are used in the main and connecting rod bearings, and the surfaces are unbroken with the exception of the annular grooves in the front and rear main bearings, which are required to allow the oil to enter and leave the crankshaft. To provide space for the oil film, a clearance on the order of .003 in. on the diameter is allowed in the main and connecting rod bearings.

With the cylinder barrel lubrication completely under control, as it is in the pressure regulated forced feed system, and with what might be termed only sufficient oil supplied to the barrels and pistons to meet the particular conditions of load, a clean combustion space and an economical oil consumption should result. The wear of the bearings and other moving parts in general should be comparatively slight, as it is possible to apply positively and abundance of oil to the bearing and at a point where it will serve the purpose best.

(Continued from page 17)

rent without regard to whether we charge one battery or fourteen at a time. You can accordingly see the advantage of charging a full line of batteries at once.

Connecting the Battery Right

"When it comes to getting a battery properly connected, we find several methods that can be used. If the terminals are marked, it is an easy matter. In a string of batteries, we always connect from positive to negative, so that the voltages add up. When it comes to connecting this string of batteries to the charging line, we do it the other way, and connect positive to positive, and negative to negative.

"If the terminals are not marked it is possible to find the polarity with a voltmeter. When the meter reads the right

way, the terminal connected to the positive post of the meter is positive. Another way is to connect wires to the battery and immerse the ends in acid or salt water. The negative wire will bubble more than the other.

"When only one or two batteries are to be charged on 110 volts D. C., they may be connected first one way and then the other and the brightness of the lamps in the lamp bank observed. The right way will be the way the lamps are dim.

"Where alternating current only is available, as in our shop, it is necessary to use either a motor generator or a rectifier. With the motor generator, the alternating current is used in the motor to produce mechanical power. Then the mechanical power of the motor drives a generator which produces the direct current we need.

"The alternating current cannot be

used just as it is for charging batteries, for it is somewhat like a pendulum which keeps swinging but never gets anywhere. In fact the ordinary current such as we have changes its direction 120 times each second, or has 60 complete cycles through which it goes. That is why we call it 60 cycle current.

"The only way it can be used then is in some way to use it only when it is going a certain way and in the rectifiers we have it is done with the bulb which has the peculiar property of letting the current through one way only. The general nature of the circuits is given in Fig. 3, but we do not have to concern ourselves with these. Operating such a rectifier is simple, as the control handle is merely turned to give a low charging rate and the rectifier is turned on. Then the control is set to give about 6 amperes."

A Particular Service for Particular People

That Is What Muller Bros., Hollywood, Calif., Have Developed in Their Maintenance Business

By JAMES V. MALONE

IF every automotive dealer had to cater to petted leading ladies and handsome, dashing heroes, we wonder what would happen to a few we know of. If your service station was located in Hollywood, California, lair of the "movie" stars, how long would you last? Could you sell "particular" people the service you now sell? After you have lived in Hollywood for a while, you become accustomed to the atmosphere which is totally unlike any other city in the country.

Beautiful homes, huge studios with their thousands of windows, cameramen "shooting" pictures from all angles and the finest collection of motor cars outside of the great national shows. Often these cars are called upon to play an important part in the making of a picture, either they are there for show or they are tearing madly alongside a racing locomotive to rescue the banker's daughter, or, they officiate when milady of the movies decides to go over and spend the afternoon with a friend. Whatever their duties, they must at all times look and be in the best of condition.

"We are right in the center of the studio district," says Frank Muller of Muller Bros. Service Station, "and about 75 per cent of our business is with the studio people. One can almost see a picture show by standing in our gas station and watching the stars driving in and out. These people all have fine cars and take great pride in keeping them up." (Just imagine Mary Pickford, Richard Barthelmess, Thomas Meighan or Bebe Daniels coming into your place and saying, "Fill it up, please." Do you do for your customers what you would have to do for them?)

Muller Bros. meet these people all day and while there may be one or two chosen friends who come to you and get preferred attention, Muller Bros. are doing that sort of thing all day—they render a particular service and it must always be that way if they are to sur-

Not that we wish to speak of unpleasant things, but take a flat tire (cheers and loud applause)—that's the time to call for Muller Bros.' Joy Wagon. Talk about service. Phone from wherever she's gone flat—if you can't bring 'er in—and we'll dash out and paralyze any puncture. If it's a blowout we'll loan you a tire while we fix yours up. Carve this phone number right on your dash-board—Hollywood 4313—and then forget tire troubles.

MULLER BROS.



This picture gives a pretty good general idea of what Muller Bros. have put into their maintenance establishment. There is a really unusual air of cleanliness and orderliness everywhere. Even in the window display which the picture scarcely shows, there is something different—it is that difference known as good merchandising

vive. There is something to this thing of absorbing the atmosphere you work in and making your work respond to it.

Muller Bros. cater to the film folk, who, if the reports issuing from Hollywood are to be believed, are a people who need a lot of "kidding" all the time to keep them in good humor. At least,

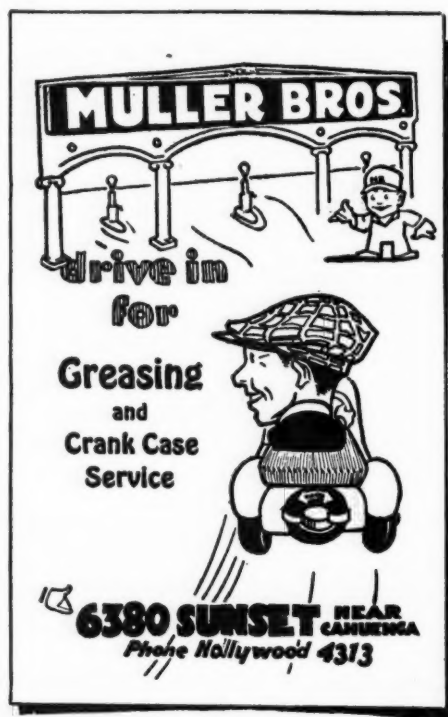
this much is known of the movie people: they are a splendid criterion for what the rest of us are because they are so widely imitated and talked of. Every sixteen-year-old boy driving a car has a notion that he could make Wallace Reid look like a blacksmith in some of Reid's famous automobile pictures and unconsciously that young fellow has acquired Reid's manner, and, very likely is a good deal harder customer than the famous movie star would have been.

Every woman who drives a car into your place does something like her favorite actress and so we have something to learn from Muller Bros. because they are right at the source of all this.

How Muller Bros. Advertise

"Our lubrication department is an interesting part of our business," Muller further explains. "We always get the customers' name and address and use our follow-up cards to bring him back."

The follow-up cards are all along the general line which makes Muller Bros.' advertising stand out—the means they



Muller Bros. have used the mails to good advantage. Here is a postcard which they have adopted to bring in lubrication business. There are others, too, used for tires and general repairs

Pardon while we quote from How to Keep Your Wagon Out of the Boneyard. "Lotta oil and grease—then more oil and grease." That means Muller Bros. Our greasing men are personally acquainted with the whereabouts of every grease cup that ever spoiled your manure. We've well lighted pits and everything else invented to get at the hard places—we overlook nothing. Drive in and let's drain, oil and grease 'er up right as often as she deserves.

MULLER BROS.



This is another post card used by Muller Bros. in reminding the car owners of the lubrication service which they offer. In keeping with their policy, the card has its direct appeal with something novel

use is humor. This very fact is a part of the way they look at their customers. They have absorbed the care-free atmosphere which permeates the town.

But there is another angle to using humor as a means of getting business. We know of many firms which have tried this and failed because they did not use the right kind. You don't have to be in Hollywood to find people who like humor—no matter where you are, you will find everyone a ready reader of anything funny.

The "trick" lies in getting your stuff across whether it be humorous or otherwise. You will find the man who tries any means, striving to do it right, KEEPING IT WITHIN ITS BOUNDS. And in this, Muller Bros. have succeeded. On these pages are reproduced some of the series which make up Muller Bros.' card system. They are printed in many colors. One of these shown here is on a blue background with white and black lettering. The same form is used in all the cards. "Drive in for Accessories and Supplies"; "Drive in for Vulcanizing and Tire Service"; "Drive in for Washing and Polishing" are the invitations printed on the other cards.

On the reverse side is a place for the name and address of the prospect or customer and a heading over it, "Post Card and Conveyor of Automotive Information." The "boxes" printed on these pages are the messages used.

Ever visit our "Beauty Parlors"? One of our washing and polishing jobs will bring back the bloom of youth to even an old tub. Simonizing by honest-to-goodness experts. Only 45 minutes on a wash job if you must have it quick. We wash 'em behind the ears and everywhere—overlook nothing. Dry steam for cleaning underneath. No man alive is more particular about a wash and polish job than a new-car dealer. Most of the Hollywood dealers have us do their washing and polishing. How about yours?
MULLER BROS.

In the lubrication department, the follow-up system is even more exact. Two of the forms used are reprinted here and, according to Muller, they "have increased our business 50 per cent." Note how the customer is shown the speedometer reading at the time of filling and what the reading will be when the car is again in need of filling.

Creating Copy

To create copy is to write something entirely new. Muller Bros. have done this as have many other dealers. Originality, no matter how crude, will sell more than the high-sounding stereotyped stuff which is machined out with such great regularity by most automotive establishments.

Stick tight to facts and do not drift off into things which the car owner will put down as Greek, and above all, "lay off the bunk"—it has ruined many a "good" man. Another thing to remember is to sell one thing at a time. Don't try to sell all your accessory stock to one buyer. Here again, we refer you to Muller Bros. Note how they have "done one thing at a time" and have done it well.

This, too, is typical of Muller Bros., their service and their ability to sell. If you think this sort of copy doesn't pay, read what Frank Muller says in this article

You won't find any left-handed monkey wrenches or overhead mud guards at Muller Bros. But you WILL find every sensible accessory and supply. We sell nationally advertised goods—no substitutes. And we stand back of 'em. No transaction is complete until you are thoroughly satisfied. Come in and let's fill your needs right—from the moto-meter to the tailight bulb. Corner Cahuenga and Sunset.
MULLER BROS.

You know what is meant by "stereotyped" stuff—it is copy that Columbus might have considered good. It tells over and over, the same story that people have been reading since automobiles first started to toot and scoot around, and it has reached that stage of life when, if it were human, it would have long white whiskers and go tottering around on a cane.

And to be new and different, it doesn't have to be humorous, either. It can sell people, not on fiction but on hard fact, and the sooner the automobile dealer comes to realize this and write it into his copy, the sooner will his advertising appropriation begin to show returns.

When you sit down to write some advertising copy, think of two things—selling and originality. Were you to rewrite what someone else has already used, you will get in return just what the first user missed which won't be very much or very satisfactory. Try something unconventional for awhile. Do as Muller Bros. have done—give the people a change and you, too, will experience a change—the kind that has a tinkle to it.

MOTOR AGE'S PICTURE PAGES



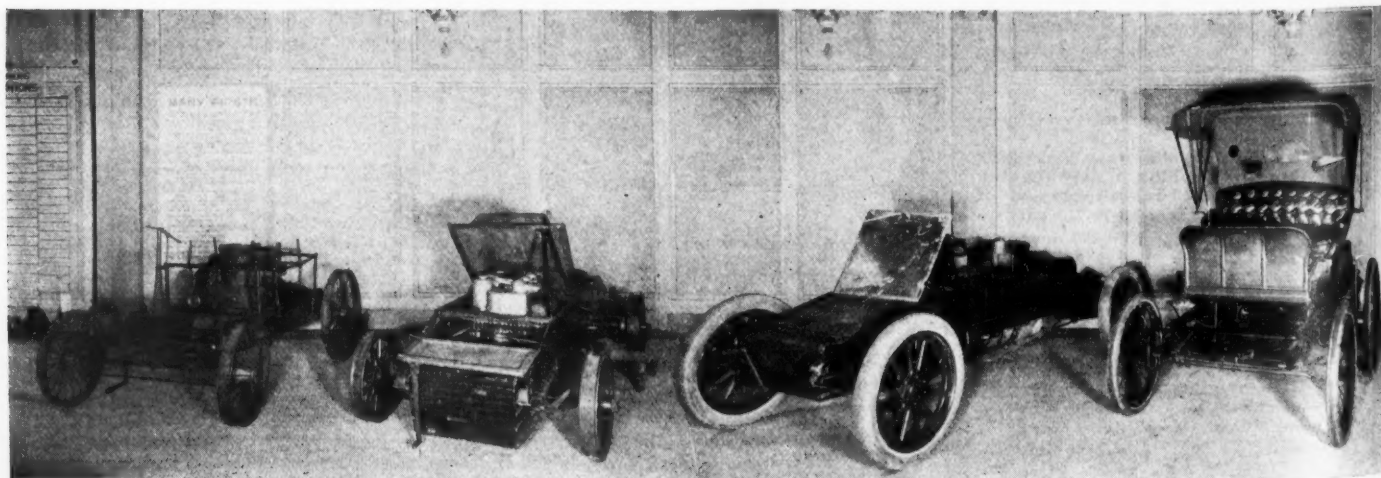
Four policemen are stationed on the four corners of 42nd Street and Fifth Avenue, New York City, to control the pedestrian traffic in accordance with signals. Here is shown one of the policemen holding back a particularly heavy jam until the signal to go



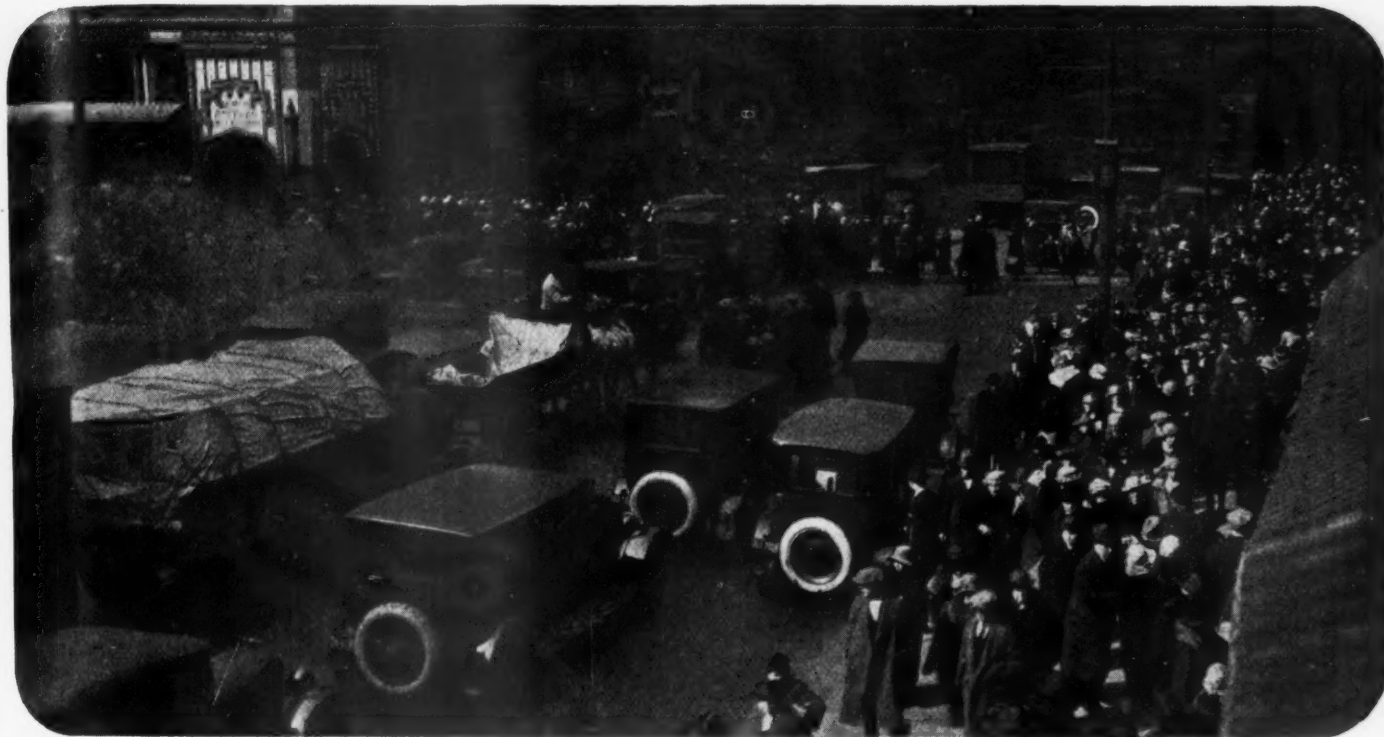
Left: The Irish Free State troops made good use of automobiles and trucks in quelling recent attacks



Below: A display of Winton cars of ancient vintage, showing the first car, as well as some later record holders. The famous Winton Bullet, third from the left, was for a long time the foremost American racing car and was driven by Alexander Winton himself



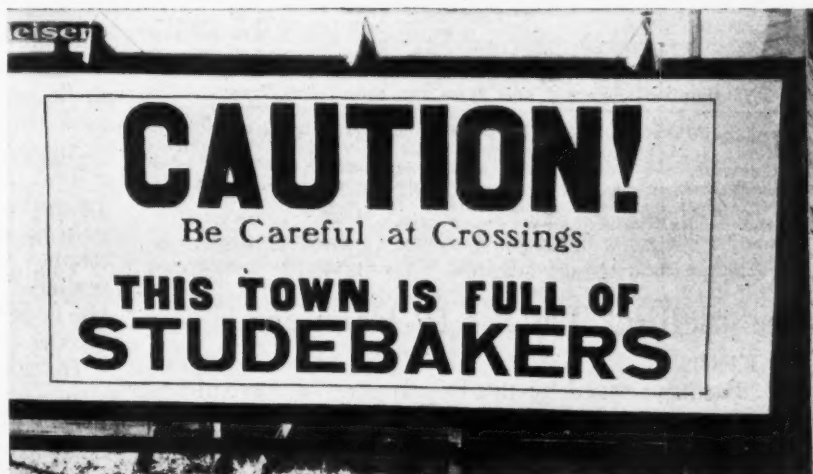
OF AUTOMOTIVE INTEREST



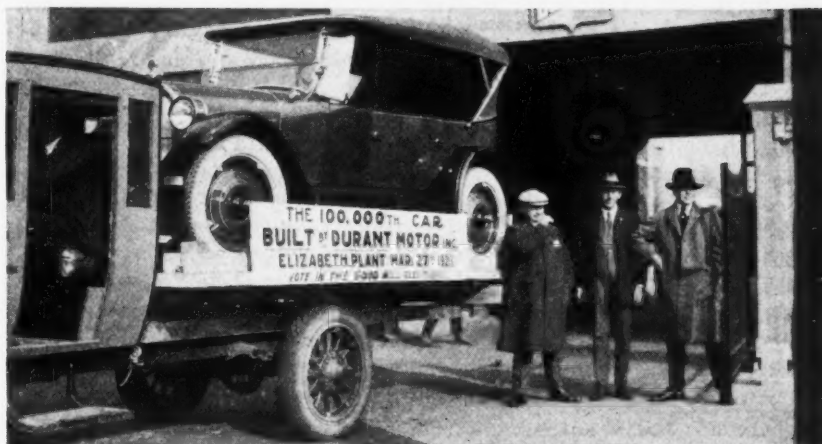
Pedestrian traffic in Chicago must be more refractory than in New York City as the New York method was tried out a few years ago and given up as a bad job. Left turns and uncontrolled pedestrian traffic are making Chicago's "Loop" a model of bad congestion



The striking piece of billboard publicity, at the right, is being used by Studebaker dealers throughout the country. It has attracted much attention because of the originality of the text and the color combination of black lettering on a golden yellow background



Walter Hagen, British open golf champion, was recently presented with an automobile by members of the Westchester Biltmore Country Club, Rye, N. Y., in recognition of his services in behalf of American golf



On March 27, Durant Motors produced its 100,000th car. This total was reached in but 16 months after manufacture started, and includes Durant, Star and Locomobile cars and Mason Road King trucks

MOTOR AGE

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Selling Trucks to Farmers

A RECENT "Survey of Motor Trucks on Corn Belt Farms," issued by the Department of Agriculture, says that the "principal sales resistance factors were poor roads and cost of operation." Which is just a way of saying the same thing twice.

C. M. Eason, of the General Motors Corp., in discussing tractors before the Society of Automotive Engineers and the National Association of Farm Implement Manufacturers last week, said, "When we design the kind of tractors that the farmer wants, it will not be a case of selling them to him; it will be a case of manufacturing them fast enough. The farmer will take to these tractors just as he is taking to the motor truck. You all know that nothing will keep a farmer from buying a motor truck when a concrete road is laid past his house."

It is the latter part of this statement that we want to call to your attention. It is the explanation of the sentence quoted from the Department of Agriculture survey. The concrete highway solves the problem of bad roads and cost of operation of the truck.

There are today automotive vehicle dealers who think that highways are not their job. The idea that anything that promotes sales like a good highway is not the job of the automotive dealer is more than silly. It shows that

the dealer is hopeless. Every dealer knows what the Department of Agriculture men say and also what Eason says is true. So why not get behind the good roads movement and sell trucks?

You build the highways, and the sale of cars and trucks will take care of themselves.



The modern man is impatient. He appreciates quick and efficient service and returns to the place where it is obtained.



The Transportation Store

EVERY day in every way we are getting stronger in the belief that The Transportation Store is the answer to the prosperity of the automotive dealer and to the best prosperity of the industry. It is a bit more than strange that so many persons should insist on the automobile owner paying so many overheads while the dealers in practically all automotive lines are leading the merchant mortality list.

Every once in awhile some veteran of the industry will arise to say that once the car dealer had all of the lines of automotive merchandise in his grasp and that he let them go, consequently he is a failure. Also, that when he had these various incidentals for sale, he gave them away. Consequently he is a poor merchandiser. More of these same things are said and pointed to with pride by these specialty manufacturers who want to keep their merchandise exclusive.

These men do not take into consideration the natural changes that come about with time and education. The automotive dealer is not, by any means, a dumbbell. He is as progressive as any other merchant and he learns in time to do many things right. It is true that he at one time gave tires and bumpers away. But in most cases he has learned better.

This automotive merchant now knows that there is a greater after market on each car that he sells than there is in the car itself. He wants to sell this car owner maintenance and the merchandise that goes with the car. He realizes that he must make a profit on these after sales. He is seeking to get the entire and lasting confidence of the car owner, so that he may sell him all that he needs.

In tires and bumpers alone he is making remarkable strides. He has a more definite market, when he stocks these articles, than the specialist. He understands what these articles mean to the complete vehicle better than the specialist. Buying from him saves the motorist time in shopping.

We believe that the time is coming, shortly, when a majority of the automotive merchants will run complete Transportation Stores. These merchants will be the pick of the car dealers and specialists of today.



Hundreds of windshield wipers can be sold at the gas pump on rainy days.



Street Cars to Pattern After Automobile Design

WHILE electric street cars have been in use for a longer time than have motor cars, it is interesting to note that the design of such cars has not progressed to a great extent. True, the cars are larger and more reliable, but the noise of their passing is such

that conversation must cease. Motor cars, on the other hand, have approached the point where operation can be practically noiseless.

Steps to reduce noise are being taken by the traction interests in Minneapolis, one step in this direction being a reduction in weight of the car from 43,000 pounds to 25,000. This is accompanied by a reduction of unsprung weight of axles, motors and wheels. Change in brake construction from the old shoe type to band brakes as used on automobiles is also included.

Reduction in gear noise is accomplished by the use of ball bearings on the armature shaft, which maintains correct alignment of gear teeth and in place of the plain bearings on axles, roller bearings are being tried out. The use of rubber block supports, a comparatively new idea, for the replacement of automobile spring shackles, is being employed on street cars, where the blocks support the weight of the car body and its load.

Even the windows are being silenced with rubber and the street car threatens to approach the automobile construction with the possible exception of rubber tires, and who knows but what this, too, may come?

It is interesting to see the traction interests copying the construction of their competitors to give to some extent corresponding riding comfort.



Shop losses grow out of wasted materials, lost tools, wasted time and "come-back" work.



The Easy Marks

PROSPERITY always brings a large crop of easy money workers and a larger crop of easy money victims. Just now the automotive business is generally believed to be the most prosperous industry in this country and consequently it is the object of the greater number of easy money workers, and we believe that the workers are prospering. At least, such are the reports that are reaching us.

Word came the other day that an automobile club, pretending to have a national organization, has signed 2500 garages as "official" at \$25 per sign. It was a part of the guarantee that this club would send 3000 tourists as possible customers to each one of these garages. This was not one of the established automobile clubs. It was just a nice private one, a very select affair.

There are a number of so-called dealer and garage men's associations that are thriving on new memberships that have never had an organization meeting and quite often a member of one of these handpicked organizations asks MOTOR AGE what they are going to get for their money.

Recently some efforts have started, and apparently are going on successfully, with a view of enrolling the automotive mechanics in an organization at so much per enrollment. The benefits of such enrollment are to be decided later.

It is kind of the automotive dealers to support all of these easy money workers while the earnest association officers, often working without pay, cannot make progress. There is a definite place for the properly organized association in this industry, but there should be no place for the one-man idea of getting money for himself.

It seems rather strange that so many dealers should fall for this stuff. It is strange that they should think to ask MOTOR AGE what they are going to get after they pay their money and not before. None of these easy money associations ever get mention in MOTOR AGE unless it is to expose them and the promoters take care that we do not hear of them if they can help it. But we can safely assure

you that we do mention the worth while associations and that we have information about them.



To make profits, aim to produce your service at the lowest possible cost.



Association Work

RECENTLY there was printed in MOTOR AGE the story of a group of dealers who made a pilgrimage to Saginaw, Mich., to learn first hand of the Saginaw plan of selling used cars. These dealers are to be congratulated on this effort to learn and it is to be hoped that in the very near future we will be able to tell the readers of MOTOR AGE that these men profited greatly by this visit.

There is, however, one point regarding this visit that we cannot quite get right in our minds. And that is, just why these dealers at this day should not have been better acquainted with the Saginaw plan and why they had not heard more of this plan in their own association work, or why they had not learned more of it through their business papers.

This Saginaw plan has been quite famous over a considerable period and Guy Garber, credited with being the author of the plan, has written and spoken quite freely at association meetings. Much of it has been printed in the automotive papers and a number of associations in various sections of the country have taken up the idea from what the members have read and heard regarding it.

We wonder if the dealers who made this trip take their own association seriously enough; if they report to this association the good things that they read and hear between meetings, and if they consider association meetings the place to discuss business difficulties with each other and rely on the age old adage that in the multitude of counsel there is wisdom.

The National Automobile Dealers' Association, the state associations and the local associations are each doing a work for the benefit of the automotive industry, but they will never do their best work until the members of these associations make the association a medium of an exchange of thought. Most local associations are not doing as much as they should because each member does not feel the responsibility upon himself of attempting to remedy the bad situations.



Collect the money your customers owe you. It is your money, not theirs.



Profit Sources

AGOOD many dealers are complaining that they cannot get the automobiles they want for customers.

Some dealers say that they cannot get enough cars to make their establishments profitable. It is a sad situation—for some.

There are other automobile dealers who cannot get enough cars to make their business profitable but who are not above selling motor boats, motorcycles or even trucks. One tractor manufacturer has a dozen automotive dealers in Iowa who are adding considerable to the profit sheet by selling tractors.

One motor boat manufacturer has twenty-five automobile dealers who are making a nice profit from his merchandise and incidentally they are getting some engine overhaul business for the winter months.

Have you ever thought about these things? Or do you really want to make money?

April Makes Gains on March Figure

Smaller Factories Increase Schedules and Bring Mark Up

Shortage of Some Makes of Cars Reported; Farmers Again Enter Car Market

NEW YORK, April 30—The first two weeks of April showed an increase in the production of automobiles and motor trucks of three per cent over a similar period in March, due principally to a higher schedule of operations adopted by the smaller producers. The major manufacturers continue to follow the level of March programs which established heretofore unequalled production marks. Little variation from the pace set at the beginning has been manifested during the month.

A shortage of the popular makes of cars is reported in many distributing centers, notwithstanding some improvement in the rail situation, the inauguration of boat service for shipments and a greater number of driveaways by dealers. The demand for cars has been so heavy that it has piled up orders with the major manufacturers and, in many cases, made immediate delivery impossible.

Parts making facilities are being taxed to make deliveries for truck builders and to keep up with the demand emanating from car producing areas. In the truck branch of the industry there are renewed signs of reawakening of interest with the consequent stepping up of operating schedules.

The output of trucks has showed a steady gain since the first of the year. In January, 19,377 of these vehicles were produced; in February, 21,815, and in March, 34,593. These figures are far ahead of those for the same months of 1922 and those for January are more than double the total for the same period in the previous year. For the first quarter of 1923 production aggregated 75,785 as against 42,372 for the first three months of last year.

This output has been readily absorbed. Agricultural districts are again in the market for motor vehicles and a steady demand is reported from commercial centers. Highway improvements, more extensive building operations and increased operations in lines of similar activity are proving an impetus to truck sales. Farm sections are carrying out the early predictions that truck interest would take a long swing in their direction during the spring.

The present demand and the outlook for motor busses are other encouraging features entering into augmented schedules at truck plants. A larger field has been developing for this type of vehicle and new outlets are being opened. Throughout the southeast, in particular, new strong interest is reported, based on the improved road conditions exist-

ing in that section and the steady advance being made toward a more extensive highway system.

Indications are apparent that tire makers have built up a surplus and are lowering their production schedules gradually. The companies have been operating on programs that, in instances, mounted to the peak marks of 1920. This has enabled them to obtain a reserve supply to take care of immediate demand.

Earl Has New Sport Phaeton With Several Improvements

JACKSON, Mich., May 2—The Earl Motors Mfg. Co. has announced a new sport model to be known as the Earl Sport Phaeton. It is a five-passenger car of ultramarine blue color and trimmings, black upholstery and disk wheels. Headlights and cowl lights are of barrel type, nickel plated. The sun shade, the top bow sockets, fenders and aprons are of baked black enamel.

Nickel radiator, trunk, nickel-plated front and rear bumpers, stop light, motor light under hood, spare cord tire, spare tube and safety gasoline shut-off valve are standard on this new car.

NEW CLYDESDALE BUS

CLYDE, Ohio, April 28—A new Clydesdale bus with four wheel brakes and a six cylinder engine has just started production at the plant of the Clydesdale Cars Co. The chassis is adaptable to any bus body seating from 15 to 25 persons and it is claimed that it can be operated at a speed as high as 50 m.p.h.

The bus is overgeared on the fourth speed and has a flat top frame which is 28 in. from the ground. The engine is a Continental and the other units include Brown-Lipe gearset, multiple disk clutch, overhead worm drive axle, and semi-elliptic springs. The rear wheel drums contain two pairs of brakes each, one pair operated by foot and the other by hand.

UNIVERSITY SERVICE COURSE

NEW YORK, April 28—Columbia University has added a new course to the Automobile Engineering Department, this being known as Automobile Service Management. It is being held at the present time one evening a week and is intended for students who desire to go into service station or garage repairing work. It covers the underlying principles which determine service station practice. The subjects covered include tool practice, time keeping and requisitioning of parts, parts department practice, new car deliveries, shop inspection, final testing, shop foreman duties, service salesmen, estimating and routing, service accounting, service cashing and the duties of service manager. The fee for the course is \$24 plus a University fee of \$6 for each session or part thereof.

Enter: the Semi-Pullman Bus With All Aids to Comfort

Pickwick Stages, Inc., California Bus Operator, Places Order for Night Service Cars

LOS ANGELES, April 28—Predictions that the time is not far distant when sleeping berths will be adopted by the operators of motor bus lines are partly borne out by the announcement by Pickwick Stages, Inc., that within three months it will put on a semi-Pullman bus service between San Francisco and Los Angeles. With this idea in mind, six specially designed bodies are being built for Pierce-Arrow chassis at a cost ranging between \$11,000 and \$12,000 each, which will provide for fourteen heavily upholstered chairs, to be built somewhat on the order of steamer chairs on each bus.

The semi-Pullman busses will be provided with every possible convenience. Blankets will be furnished each passenger, although, of course, there will be no facilities for disrobing. All chairs will be stationary and ample room will be provided between each chair.

At the outset of the new service, the new type of busses will be operated exclusively in the night service between Los Angeles and San Francisco, a distance of 455 miles. Busses will leave either city at 6 o'clock each night, arriving at their destination at 10 o'clock the next morning. An excess charge of \$3 will be made for passage, above the regular rates of \$12.85 one way and \$20.50 for the round trip. At present 40 are operated by the Pickwick company between the two cities and five complete services are maintained.

If this semi-Pullman service proves a success, it is the intention to install the same type of busses between San Francisco and Portland, a distance of 720 miles. Over this route the Pickwick company now operates twelve busses, taking three days for the trip, driving being confined to daylight hours. The rates for the San Francisco-Portland service are \$18.50 one way and \$35 for the round trip.

G. M. S. EXPANDS

ALTOONA, Pa., April 28—The General Motor Supply Co., has just added 6,000 square feet of floor space to its building which gives it a floor space of 13,000 square feet. The company has added additional salesmen and reports that business is 40 per cent better than a year ago.

Sales in central and western Pennsylvania are stated to be better now than they ever have been, and from the present outlook it appears that 1923 will prove to be the best year in the company's five years of business.

Figures Show Magnitude of Industry

Startling Figures in Six Months, Say Ford Officials

Weekly Purchase Plan Going Over Good; Factory Working at Top Speed

DETROIT, April 28—Dealers' orders for Ford cars to be delivered in May approximate 300,000 cars, the company reports, with a total production possibility of about 160,000. In the face of present and anticipated conditions, the company expects to continue operations at capacity for the balance of the year, with an output for the entire year of well over a million and a half.

Sales in the first quarter of the year of 395,962 are reported the highest for any quarter in the company's history, and an increase of 135 per cent over the same quarter last year. In the last year, the company reports, approximately 1,500,000 new cars and trucks have been placed in owners' hands.

In the face of the oversold condition of the market, the company reports the weekly purchase plan as giving retail salesmen an additional incentive for working along at top speed. With deliveries tied up for the present, salesmen are being urged to give all their attention to signing up buyers on the weekly purchase plan. This will give them a steady flow of commissions as possession of cars is taken in the future. To the factory it means a regular run of business through the year, reducing the extreme rush in the early spring months.

ANSTED RECEIVERS

CONNERSVILLE, Ind., April 26—Arthur A. Dixon, vice-president and general manager of the Ansted Engineering Company, and Hyatt L. Frost, member of the board of directors of the Fayette Bank and Trust Co., of Connerville, were appointed coreceivers of the Ansted Engineering Company this afternoon by Judge E. Ralph Himelick in Fayette Circuit court here, following the hearing of the receivership suit instituted by a group of four creditors last Monday. The receivers gave bond of \$100,000, and took control of the plant late today.

The plant will be continued as a going concern in the manufacture of automobile motors, according to Dixon. It is stated that the firm has considerable business in prospect.

CHECKER BUYS HANDLEY PLANT

KALAMAZOO, Mich., April 30—The Checker Cab Manufacturing Co. of Chicago, has closed a deal for the purchase of Handley Motors plant and the Dort Motor Car Body plant here. The Checker company intends to move its entire establishment and general offices to this city.

James I. Handley of the Handley Mo-

tors Corp., said an arrangement probably will be worked out whereby the Checker company will continue the manufacture of the Handley car, the sale of which would be directed by Handley.

APPERSON BOND ISSUE

KOKOMO, Ind., April 28—Apperson Bros. Automobile Co. has strengthened its financial position by successfully putting out a bond issue of \$700,000 and three year debenture notes for \$383,000, making a total of \$1,083,000, which has been used in funding the company's bank loans and materials accounts and to provide a working fund for increased production. This is the first time the company has interested outside capital.

At the same time E. L. Apperson has been advanced to the position of chairman of the board of directors, in charge of engineering and production, while N. H. Van Sicklen now is president and general manager, functioning as chief executive. B. C. Buxton, formerly a prominent Chicago dealer, has been named as vice-president in charge of finance, while E. M. Lubeck is general sales manager.

S. A. E. DISCUSSES TRANSPORT

CLEVELAND, April 28—The vital need for better correlation and more efficient operation of transport facilities in the United States was the point stressed most strongly at the first Automotive Transportation Meeting of the Society of Automotive Engineers held in this city ending today. A detailed discussion of recent rear axle tests was presented by the Bureau of Standards, taxicab body construction was given attention and several other topics were mentioned incidentally. But the big thought that the session developed was that of getting better transportation on a unified basis. The growth of truck transportation was discussed.

WILSON HEADS VICTOR

ST. LOUIS, Mo., April 28—Guy T. Wilson who was instrumental in the formation of the Traffic Truck Corporation six years ago has been named the head of the Victor Motors, Inc., a new organization in this city. The company is to be incorporated of \$3,000,000 and it is expected will employ about 2000 men when completed.

The company will specialize in three distinct types of trucks, the heavy duty, the speed truck and the taxicab and it is their aim to place St. Louis made taxicabs in all railway stations of the country.

ELGIN ASSETS SOLD

CHICAGO, April 30—Tangible assets of the Elgin Motor Car Corp., exclusive of building and real estate, were sold piecemeal at receiver's sale last week for approximately \$75,000. The receiver is endeavoring to sell the buildings and real estate at private sale.

"Facts and Figures" for 1922 Is Ready for Distribution

N. A. C. C. Declares Investment in Motor Vehicle Manufacturing Totals \$1,456,649,954

NEW YORK, April 30—Facts and Figures, issued annually by the National Automobile Chamber of Commerce, giving statistics regarding the progress of the industry for 1922, is ready for distribution.

As compiled by John C. Long, it shows that 1922 was a record year, with 2,406,396 passenger cars and 252,669 trucks, a grand total of 2,659,064 motor vehicles, an increase of 60 per cent over 1921. This total includes vehicles made in Canada in plants controlled by United States companies. The net production figure for motive vehicles made in the United States is 2,561,000.

The N. A. C. C. estimates that there is \$1,456,649,954 capital invested in the motor vehicle manufacturing business; that the various manufacturers bought \$1,289,614,326 worth of materials; employed 253,105 persons and paid \$395,707,531 in wages and salaries. The wholesale value of the complete car and truck output was \$1,789,638,365; the value of parts and accessories replacements, \$380,503,024 and the value of tire replacements, \$388,066,000.

Tire and fuel figures show that 6,202,234,613 gallons of gasoline produced in the United States and 5,382,504,187 gallons consumed, of which 80 per cent was used by motor vehicles. It is estimated that 40,930,852 tire casings were manufactured.

Analyzing the truck production, Long finds that of the total of 252,668 manufactured, 62,194 were $\frac{3}{4}$ ton or less; 147,796 1-ton; 7,134 2-ton; 13,830 $1\frac{1}{2}$ -ton; 13,830 2-ton; 11,247 $2\frac{1}{2}$ -ton; 3,319 $3\frac{1}{2}$ -ton; 5,718 5-ton; 1,430 over 5-ton. In 1921, 147,550 trucks were manufactured.

The Chamber reports the registration of 12,239,114 motor vehicles in 1922 as against 10,464,005 in 1921.

In the matter of exports the total value of United States automotive exports was \$125,642,852, including motor vehicles, parts, engines and tires, giving a ranking of sixth among all United States exports including materials.

United States motor vehicles exported numbered 78,549, of which 67,096 were cars and 11,453 trucks. Motor vehicles shipped to United States territories totaled 3,395 and Canadian motor vehicles exported, the output of branches of United States companies, were 37,958. The leading motor car foreign market was Australia, while Belgium was the best truck customer. The imports of motor vehicles totaled 456.

It is estimated that there are 3,500,000 motor vehicles on the farms, of which 300,000 are trucks.

Boston Dealers Think April Will Be Their Record Month

Shipments From Factories Are Moving Rapidly; Used Car Threatens

BOSTON, April 28—Motor car dealers in Boston expect that April will break all records for the sale of cars in this territory. Cars are coming through in better shape now than for several months. One reason for this is that a lot of shipments are being sent forward on the open flat cars because the weather is more seasonable. And as cars shipped this way covered only by canvas are easy prey for thieves, the railroads want to get rid of them as soon as possible to save the expense of replacing stolen attachments.

From Boston, many cars are being driven over the road to places in Massachusetts day after day. The dealers are not bothering with closed salesrooms now on holidays, for on Patriot's Day, April 19, all the places were open and some business was picked up.

One of the noticeable effects on sales seems to be the advertising results. Dealers who are behind on orders in all classes reporting increase sales are in the large majority of cases those whose factories are now putting out a lot of good advertising. On the other hand, some of the dealers who complain that sales have slowed up, are found to be in the class that have not done any advertising for some months, whose factories depend upon national advertising for sales, which, as far as Boston is concerned, are not being made.

So big a wave of orders are flooding some of the dealers that they expect April and May will be larger than any four or perhaps five or six months of 1922, which was considered a phenomenal period.

Used cars have not been moving fast due to the cold weather. It is believed warmer weather would help sales. If they do not move the used cars soon, and prices go up on new ones, dealers who find the sales of their new models slowing down expect to get into a jam with the coming of Summer.

CADILLAC CHANGES

DETROIT, April 30—A number of minor changes have been made within the past few months in the Cadillac Type 61 chassis. Some of these are changes in manufacturing operations and others are slight changes in details. Transmission gears are now ground to very fine limits to provide greater smoothness in operation and general quietness. The gear hubs have been increased in size.

The cooling system has been improved by a finer adjustment of the thermostatic control of the water pumps. The thermostat valve has been changed by removing the spring from its top and making the Syphon thermostat an integral part of it. The spring leaves are ground across the width and the ends to mini-

mize wear at the spring ends and prevent noise or snapping. The bodies remain practically unchanged but a touring trunk has been added to the phaeton, sedan and landau.

The rear seat of the phaeton is 2 in. wider. A new type of deck chair is furnished as special equipment on the roadster, and on the phaeton the tonneau light has been moved from the center of the back of the front seat to the right side. The interior fittings of the enclosed cars has been modified slightly for comfort and convenience.

Gasoline Drops Twice in a Week at Boston

BOSTON, April 27—The Standard Oil Co. and the Jenney Oil Co. announced that beginning tomorrow there would be a cut of one cent a gallon in the price of gasoline. That was the second drop this week and it is now selling at 25 cents a gallon through the state. Other companies will follow suit, undoubtedly. This brings the wholesale tank wagon price to 22½ cents a gallon. It was stated that the cut was due to an oversupply of crude oil from California finding its way to the markets in the East.

MURPHY WINS AT FRESNO

FRESNO SPEEDWAY, April 28—Taking the lead in the ninth lap and holding it throughout, Jimmy Murphy of San Francisco, driving a Durant Special, won the annual 150 mile Raisin Day race here Thursday. Murphy covered the distance in one hour, 26 minutes and 54 seconds. Eddie Hearne, driving a Durant Special was second and Benny Hill, winner of last Fresno meet was third, driving a McDonald Special. Earl Cooper, driving a Durant Special was fourth. Frank Elliott, driving a Durant Special, was fifth and Joe Thomas with a Duesenberg, sixth. The remaining six cars that started failed to finish. The attendance was 40,000.

KENTUCKY DEALERS ELECT

LOUISVILLE, Ky., April 28—J. E. Kittrell, Lexington, succeeded himself as president of the Kentucky Automotive Trade Association when the directorate met in annual session April 25. Other officers chosen were: Vice-presidents, W. A. Thomas, Louisville, and W. T. Stewart, Lexington; secretary, Geo. T. Holmes, Louisville and treasurer, Eugene Cowles, Shelbyville. Stewart succeeded E. A. Diess, Lexington; the others being re-elected.

CORRECTION

Last week in a news item in MOTOR AGE mention was made of the automobile manufacturers whose production announcements indicated that they would build more than 100,000 cars this year. A similarity of sound of names caused an error. The firms listed should have read: Ford, Durant, Chevrolet, Overland, Dodge, Buick, Studebaker.

Durant Texas Representative Invades Mexico; Takes Towns

Business is Much Better Than Last Year; Many Cash Sales Made

MONTEREY, Mexico, April 28—E. E. Bartholomae of the San Antonio Motor Sales Company is making an automobile tour of Mexico, visiting the principal cities, for the purpose of establishing agencies for the Durant and Star automobiles. He is accompanied by F. Martinez, who is familiar with the automobile business in this country. It is stated that on the present trip agencies will be established in Monterey, Saltillo, Torreon, San Luis Potosi, Durango and Tampico. To a certain extent these two trade emissaries are pioneering the routes of automobile travel. While the road from Laredo on the Texas border to Monterey, 150 miles, was found to be fairly good, ox-trails will have to be followed to reach some of the cities that are embraced on their itinerary.

According to information received here, the automobile business of Mexico generally shows considerable improvement over what it was a year ago. It is pointed out that the increase of sales is an evidence of the fact that there is still much ready money in the country and that it is being hoarded. Dealers report that their customers pay cash for the cars and that it is seldom that this is done by means of checks upon banks. The Federal Government is slowly perfecting its plans for the construction of a modern highway system. Some road construction work is now under way, but it may be some time before general improvements of this nature are started.

MOON BREAKS RECORD

ST. LOUIS, Mo., April 30—The Moon Motor Car Company has announced that on Thursday, April 19, it broke all previous shipping records of the company by shipping 63 cars that day. "March sales were the greatest in the company's history. More cars were shipped during that month than in any previous month in our sixteen years of motor car building," says Stewart McDonald, president of the Moon company.

"WINGFOOT" NAME ON TIRES

AKRON, O., April 30—A change in trade name from Cross-Rib to Wingfoot, applying to the Goodyear tire with the cross-rib tread design, placed on the market about ten months ago, has been announced by the Goodyear Tire & Rubber Co. The symbol "Wingfoot" is known to the tire trade and public generally in the Goodyear trade mark.

DORT DROPS YALE CARS

FLINT, Mich., April 30—The Dort Motor Car Co. has discontinued the four and six cylinder Yale coupes and sedans, which were priced at \$1020, \$1070, and \$1195.

Heaviest Volume of Sales Ever Recorded in Peoria

Some Wild Trading and Lots of
"Knocking" by Salesmen,
Are Reported

PEORIA, Ill., April 27—A canvass of the vehicle and accessory dealers of this distributing center brings reports of the heaviest volume of business ever recorded here. At a recent get-together meeting those present practically agreed that the business for the first three months had been so heavy that they expected a slump to start in April. However, reports for the first half of April show a heavier total sale than the entire month in 1922 and an increase over the same period in March, with no signs of a let-up.

The used car demand is very brisk and those who are "buying 'em right" report good profits. But there is considerably wild trading going on despite the excellent demand for cars. Predictions are freely made that some dealers here and in the county towns are selling so many cars that their used car allowances will almost certainly break them.

Ford dealers in this district report an exceedingly heavy proportion of no trade sales and some of the larger dealers who conduct used car departments are below a normal stock. Coal miners are reported to be heavy buyers of Fords. Peoria is a heavy distributing point, some of the distributors here controlling the sales in as many as 30 counties. They report that the sales in the smaller towns are running very high and there can be no question but that the farmer in this section is buying, and buying a higher priced car than in previous years.

A serious factor in the trade in this section has been an outbreak of "knocking" among salesmen in the highly competitive list of cars. So general has this practice become that wagers on endurance contests are being arranged.

SMART HEADS MEMPHIS DEALERS

MEMPHIS, Tenn., April 29—Thomas H. Smart has been elected president of the Memphis Automobile Dealers' Association to succeed Owen Lilly, of the Lilly Carriage Co., who has held the post with great honor for several years. Other officers elected were: Vice-president, Jerome P. Parker; secretary, Thos. N. King; treasurer, Steve H. Butler. The association voted to become a division of the Chamber of Commerce, functioning however as an independent unit.

HAYNES CO. EXPANDS

KOKOMO, Ind., April 27—The Haynes Automobile Co., during the last seven months has added to its retail organization, 35 dealers and 15 distributors. These new addition are in various parts of the United States and Canada. According to Gilbert U. Radoye, director of sales and advertising, the production of the Haynes plant will make 1923 the greatest in its history.

INCREASES CAPITALIZATION

NEW YORK, April 23—An increase in its capitalization from \$4,800,000 to \$6,000,000 has been made by the General Motors Acceptance Corp. in order to provide for its rapidly expanding business. The entire issue is owned by the General Motors Corp. The Acceptance corporation reports that the first quarter's business amounted to \$54,726,000 compared with \$77,500,000 in the entire year of 1921.

Stockholders Wrangle Over Fate of Northway Motors

NATICK, Mass., April 25—About 1000 stockholders attended the meeting of the Northway Motors Corp., here today to settle the affairs of the company. There was much discussion, some of it in angry tones, as the affairs of the company were debated. This was due to the fact that many stockholders learned for the first time that they really had no legal say in the company's future.

A year ago, it appears, in some way or other they delegated the entire affairs of the company to five trustees appointed for life. When this was brought out many clamored for the trustees to resign, but the latter refused. Then the meeting chose a committee of five to obtain the trustees' resignation, if possible, before the stockholders' meeting here next week.

The trustees, who have complete, unlimited control are Judge Henry C. Mulligan, Stephen L. Holmes, Frank V. Noyes and Reginald Heath. Ralph E. Northway, head of the concern, was one but he resigned after April 1. Northway presided at the meeting and had the difficult task of keeping order.

SEEK EYE EXAMINATIONS

BUFFALO, N. Y., April 28—Compulsory eye examinations for motorists will be sought by optometrists, it was indicated at the session of the Tri-City Optometric society in Buffalo recently. The organization is composed of optometrists in Western and Central New York.

Dr. F. E. Cushing, of Niagara Falls, secretary and treasurer of the organization, read newspaper clipping telling of a motorist who was unable to appear in city court following an automobile accident because he was affected with eye trouble.

AUBURN PRICES UP

AUBURN, Ind., May 1—The Auburn Automobile Co. has announced an increase in the prices of its models, effective today as follows:

"Supreme Six" Models		
	Old Price	New Price
Touring	\$1650	\$1725
Sport	1895	1985
Brougham	1965	2045
Sedan	2245	2345
6-43 Models		
Touring car	1095	1165
Touring sedan	1465	1535

CHICAGO DAYLIGHT SAVING

CHICAGO, April 29—Daylight saving, when clocks are advanced one hour, goes into effect here today.

Detroit Sales Total 6,895 for March; Twice February

Truck Sales Are 641 Compared
with 387 for Last Month;
Outlook Good

DETROIT, May 2—Retail sales of passenger cars in Detroit during March totaled 6,895, more than doubling sales for February which totaled 3,060. There was an almost even division as between open and closed models, the former being slightly in the lead by figures of 3,627 to 3,268. Truck sales for the month were 641 which compared with 387 in February.

In the doubling of business practically every manufacturer showed a similar accomplishment, Ford's part of the total was 2,839 as compared with 1,507 in February, and peculiarly for the season, Ford closed business exceeded open by seven cars. Chevrolet jumped from 386 to 1,146; 696 open and 350 closed. Star jumped from 58 to 179 and Overland from 39 to 117.

In the middle priced field Buick jumped from 131 to 423. Studebaker from 153 to 387. Hupp from 164 to 316. Dodge 62 to 185. Hudson-Essex continued to lead in proportion of closed to open models, Hudson showing 106 closed to 39 open, and Essex 118 closed to 21 open. Hudson and Essex each sold 51 cars in February. Willys-Knight jumped from 60 to 128 and Jewett from 62 to 138.

In the high priced field Cadillac business increased from 24 to 57; Packard from 17 to 47. Lincoln 3 to 14.

Locomobile and Rolls-Royce broke into the sales column for the first time this year, the former having 2 and the latter 1. Reo and Rickenbacker showed increases from 7 to 46, and 10 to 42 respectively. Oakland and Olds jumped from 37 and 21 respectively to 70 and 62.

Of the truck total of 641 Ford had 430; Dodge and Reo had 38 and 22 respectively. In the heavy duty field Federal had 25, G.M.C. had 21 and Packard had 16.

VETOES GAS TAX BILL

DES MOINES, Ia., April 27—In spite of all predictions to the contrary, Governor Kendall has vetoed the two-cent gasoline bill passed by the fortieth general assembly. In giving his reasons for vetoing the bill, Governor Kendal stated that such a law would be of no benefit to the farmer even though the county and township road levy were remitted.

The governor suggested in his veto message that if more revenues were necessary, they be derived from a moderate tax on the larger individual and corporation income by uncovering much moneys and credits now undisclosed to the taxing authorities.

Automobile men are jubilant over the veto. Although motor trades men favor anything that will lead to better roads in Iowa, most of them feel that even now the automobile owner is too highly taxed.

Citroen Sails for France; Plans for U. S. Plant Soon

**French Manufacturer Leaves Orders
for \$2,000,000 Worth of Amer-
ican Machinery**

NEW YORK, April 25—Andre Citroen has gone back to France after three weeks in this country in which time he met prominent financiers and discussed plans for establishing in this country a factory for the manufacture of Citroen cars; visited Detroit, Cleveland and several other motor centers; met Henry Ford at Detroit; ran down to Washington and discussed the labor situation with Samuel Gompers and finally placed orders for \$2,000,000 worth of American machinery for his French factory, taking back with him an engineer from each of the five companies from which he bought his new machinery.

That he will establish an American factory for the manufacture of the full line of Citroen cars seemed an assured fact when he sailed for France today and it seems almost certain that when he returns within ten weeks that his plans will be completed. Those settled, he will endeavor to begin operations at once, with the idea of bringing out his first American built Citroens by fall and be ready for 1924.

Citroen's financial negotiations have been with the American International Corp., the \$50,000,000 organization of which F. A. Vanderlip is chairman of the board, the executives of which held a banquet in honor of Citroen following his return from Detroit. After that dinner it was given out that a Citroen factory in this country is a certainty and it was stated that it would be near New York City.

This statement makes it seem possible that the plant will be at Camden, N. J., where the New York Shipbuilding Corp., a subsidiary of the American International Corp., is located. It is known that for some time the latter has been working on plans for the building of motor busses in this Camden plant and it is thought that possibly Citroen could be accommodated as well.

While here Citroen visited Detroit, Flint, Toledo, Cleveland and Washington and on this swing around the circle he inspected the Ford, Dodge, Buick, Chevrolet, Overland, Hupmobile and Cadillac plants. He also placed orders for his new machinery to be sent to France with the Erie Foundry Co., the Toledo Machine and Tool Co., Young Bros., the Palmer-Bee company and the Lane Co. This new machinery will be installed by Jan. 1, he expects, which will permit him to jump his production from 125 to 250 cars a day, with the ultimate hope of reaching 500.

CHEVROLET PRICE LIST

DETROIT, May 2—Chevrolet Motor Co. has issued a price list on all models which establishes the prices on the cop-

per-cooled models on a somewhat lower basis than was anticipated when these models were first announced. The established price on these is roadster \$580, touring \$595, utility-coupe \$750, sedan-ette \$920, sedan \$930.

Discusses Flat Rate Before Peoria County and City Men

PEORIA, Ill., April 25—The Peoria Automobile and Accessory Dealers' Association was host to the dealers of Peoria County last night. More than 150 dealers and salesmen were present. Clyde Jennings, editor of MOTOR AGE was the speaker. He discussed the objective and effect of the flat rate system.

A. G. Thede, Velie Motor Co.; R. F. Graham, Graham-Selzer Co.; and E. R. Maleham of the Maleham-Franklin Co., were elected directors.

In a call for the suggestions for activities of the association for the next year, practically all of the speakers asked that some plan be devised to control the used car situation. H. B. Pinkerton, Howard Kinsey and F. C. Zillman were in charge of the meeting.

LIQUIDATE MITCHELL ASSETS

RACINE, Wis., April 30—Herbert F. Johnson, president of S. C. Johnson & Sons Co., who was appointed receiver of the Mitchell Motors Co., Inc., is proceeding to liquidate the assets as quickly as possible. The plant, which suspended operations March 1, will not be placed in production, at least until disposition of the property has been made in the course of the receivership and new ownership becomes effective. Appraisals are being made and schedules prepared for filing under the involuntary bankruptcy proceedings.

It is stated that the liabilities approximate \$4,000,000 and the tangible assets are worth \$2,000,000. The effort at disposition to be made in due time will be to keep the industry intact and avoid piecemeal sales of buildings or equipment.

FORD FARMER MEETINGS

ST. LOUIS, April 30—Farmers' meetings were held by the local branch of the Ford Motor Company throughout this district each day except Sunday for the past 12 weeks with a view to bringing data to the farmers concerning their business. The meetings were held in theaters of each town and the attendance ranged from 400 to 3000. The territory covered included, Missouri, Illinois and Kentucky. The Ford Company showed the advantages of motorization of farm equipment.

WARNS AGAINST ACCIDENTS

ST. LOUIS, Mo., April 28—The St. Louis Automobile Dealers' Assn., through its secretary Robert E. Lee has sent out a letter to members warning them of the danger of giving rides to children and others, pointing out the danger of claims which might be advanced in case of accident.

Vane at Chicago Tells of Hazards of "Wild Trading"

**Addresses Chicago Dealers on Used
Cars; Warns Against Reckless
Sales Tactics**

CHICAGO, April 28—C. A. Vane, general manager of the National Automobile Dealers' Association, was speaker at the first of a series of mass meetings planned by the Chicago Automobile Trade Association. More than 500 were present, the audience being made up of dealers and salesmen.

Vane's discussion was based upon the figures that show the average life of the automobile dealer to be 3 years and two months and the part the salesman might have in contributing to this short life. In speaking of the used car show that opened the same week, Vane referred to the need of a certificate, used for cars exhibited in the show as an evidence that the dealers of the city had not in the past conducted their used car business in a manner that would win the confidence of the public. He also said that this lack of confidence of the public in the dealer was well illustrated by the fact that there already had been a sharp demand for cars already certified by this committee.

The speaker expressed the opinion that when the automobile dealer made the proper use of the discount extended to him by the factory and built for the proper confidence of the public in his maintenance and used car departments that the average life of the dealer would be much longer than at present.

He declared that in his opinion, wild trading for used cars was only a means of price cutting and he predicted that if the present vogue of trading was continued for the next six months, that the heavy sale of motor cars would break more dealers than in any other year. His figures showed that there were fewer failures in lean years than in good years, because there were not so many sales to lose money on by the wild trading.

Henry Paulman, president of the Chicago association, presided and C. E. Gambill was chairman of the meeting committee.

GOUX IN SCHMIDT-SPECIAL

INDIANAPOLIS, Ind., April 29—Jules Goux, best known of the foreign pilots who will invade America to compete in the International 500-mile dash for \$50,000 to be held at the Indianapolis Motor Speedway, Decoration Day, May 30, has entered a Schmidt-Special in the coming event.

Goux was a member of the original French contingent that came to America in 1913 to compete for racing supremacy of the world on the Hoosier oval. He couldn't understand a single word of English but just to demonstrate that driving a racing automobile is internationally common, he stepped out and took the trophy for the year. Goux's winning average in his Peugeot in 1913 was 76.92 miles an hour.

Scheel Not Superstitious— Takes 13 for Indianapolis

Two Drivers in Other Years Wearing the "Unlucky Number" Lost Out

INDIANAPOLIS, Ind., April 28—Number 13—considered a hoodoo by many superstitious folks—will appear on one of the cars entered in the 500-mile dash for \$50,000 at the Indianapolis Motor Speedway, Wednesday, May 30.

The mount, a Scheel-Frontenac, the fourth car of a team being built by Louis Chevrolet, under the sponsorship of the Scheel Motors Corp., St. Louis, Mo., will be piloted by Herbert Scheel, president of the company, and a wealthy sportsman, who has taken to the track to prove his principle of rotary valve motor construction.

Number 13—always skipped when numbers are being passed out for the cars at Indianapolis, was requested by Scheel. Last year it was to have been painted on the car the late Wally Reid was officially entered to drive. Twice before, it was used at the Indianapolis track, but with little or no success. J. F. Gelnow was No. 13 in his Fal car in the 1911 race. George Mason piloted No. 13, a Mason, in the 1914 race, neither finishing within reach of the ten money-grabbing positions.

Scheel has driven the dirt tracks for several years and previous to assuming the wheel of racing cars was well known as a speedy motorcycle pilot. He will have a relief driver, Elmer Dempsey, associated with Scheel in business.

Dempsey explains that "thirteen" has always been lucky for him. He cites that thirteen car-loads of St. Louis people will come here to cheer for the Missouri city's entry in the big race.

SPRINGFIELD PLANTS BUSY

SPRINGFIELD, O., April 28—During the last week the Springfield works of the International Harvester Co. increased its production schedule from 25 to 50 motor trucks a day. This is pointed to as an indication that the demand for these light speed trucks is increasing. The company is also doing a large amount of shipping.

The Kelly-Springfield Motor Truck Co. started Monday on a late schedule to meet the demands of the trade. The plant is now being operated each night until 9 p. m. Pearl A. Lewis, receiver, says the company is doing a wonderful business; that it is way beyond his expectations. The company has a general run of orders from various parts of the country, and also orders for fleets of trucks.

Production has been increased at the plant of the Westcott Motor Car Co. The change in weather conditions is expected to increase the demand for cars. Karl Heinzen says the demand for Westcotts is especially brisk in the east, and conditions are improving in the middle-west.

BACK GOOD ROADS

LOUISVILLE, Ky., April 28—A pledge of cooperation in efforts to further a \$50,000,000 State Road Bond issue bill was given by the Louisville Automobile Dealers' Association recently at a meeting at headquarters.

The association is now composed of thirty-five dealer members, the largest membership in its history. All the eligibles in the city, except two, are members, it was said. Some of the dealers in the city have not been in business sufficiently long under the rules, it was explained, to become members.

Tax Law Gets Jolt in the Original Tax Jolt State

BOSTON, April 30—The attempt of tax collectors in Massachusetts to make every motorist pay a tax on his motor car regardless of when he bought it, got a rude jolt this week when Attorney General Jay Benton said such a tax would be unconstitutional. The tax collectors met some months ago and drew up a bill that was filed with the legislature. It got a hearing and the tax gatherers told a tale of how motorists sought to dodge taxes by selling their old cars in March and getting new ones in April. The tax levy goes on April 1, and only property owned on that day is taxable under the law.

The tax collectors sought to prevent any cars being registered until the owners first paid a property tax to the city or town, and then got a permit from the municipal officials. The questions of the legality of the tax came up, and it was referred to Attorney General Benton for an opinion. He ruled that in order to be constitutional the bill would have to provide that the tax be at the same rate as that applying to other property, or have as the subject of taxation something produced, manufactured, sold or "used in a way as affecting the public interests."

BUS LEGISLATION

MASON CITY, Ia., April 28—A Supreme Court decision handed down this week prevents Iowa municipalities from passing prohibitive or unreasonable ordinances regulating operation of motor bus companies on city streets. The court held a Mason City ordinance invalid when effort was made to bar the Star Transportation trucks from the city streets. The ordinance specified a \$300 license fee annually for each passenger bus of more than 10 passengers, and a \$50,000 bond on each bus, in addition to forbidding its operation over streets served by electric lines.

The Star Transportation operated four 20-passenger busses between Mason City, Garner and Hampton, and contested the Mason City ordinance through injunction proceedings. The lower court held that the city had no power to regulate inter-city traffic and that the ordinance was unreasonable and prohibitive. The Supreme Court sustained the trial court's opinion.

St. Louis Dealers Adopt Code of Ethics for Business

"Sincerity, Fraternity and Fair Dealings" Is Keynote of Code

ST. LOUIS, Mo., April 28—St. Louis automobile dealers have adopted a "code of ethics" for the conduct of their business and will display the code on a poster in their places of business. It was adopted at the annual meeting of the association this month.

The code follows:

"We, the members of the St. Louis Automobile Dealers' Association, recognizing in the automotive industry a field for public service, as well as personal endeavor, propose that its foundation shall rest on sincerity, fraternity and fair dealings. We believe that the dignity of this service demands those methods of administration and salesmanship which have become standardized in the trade ethics of the older industries.

"We, therefore, declare our purpose, in placing before the public the merits of our own goods, to avoid belittling our competitors or disparaging their products.

"We acknowledge our great responsibility as heads of our respective organizations, for the trade tactics of our employes, and our duty to lead the way to the right and honest transaction of our affairs.

"We pledge ourselves to test by these principles the daily conduct of our business."

KELSEY PLANS APPROVED

NEWARK, N. J., April 27—Judge Runyon of the United States District Court has approved the plans for the reorganization of the Kelsey Motor Co. and the officials are losing no time in getting under way. Receiver Stuart A. Young will remain in charge until the reorganization is completed. Production on 100 cars will be started at once, with manufacturing efforts concentrated on the gear car which lists at \$1,150.

As planned there will be no change in the name of the company or in the personnel of the executives, Charles W. Kelsey remaining as president. The re-financing consists of incorporating under Delaware laws and issuing 400,000 shares of no par common stock in place of the 400,000 shares of no par common and 200,000 preferred at \$10 which the old company carried.

DURANT PRODUCTION AIM

NEW YORK, April 28—Durant plants, working on a production schedule of 19,500 cars for April, turned out 9,000 the first half of the month. In May it is planned to manufacture 28,600 and in June 29,950. Aiming at the coveted goal of 1000 cars per day, the Durant plants reached a high water mark of 989 on April 12. The corporation now claims 3000 dealers in the United States and Canada.

U. S. Rubber Co. Has New Processes for Tire Making

Inform Stockholders of Newly Patented Principles for Manufacture

NEW YORK, April 28—C. B. Seger, chairman of the board of directors of the United States Rubber Co., in a letter to his stockholders, tells them of the acquisition of "three new and basic forward steps in rubber manufacture" which have been patented by the company and which are its property.

These three discoveries are sprayed rubber, web cord and a new method of building and vulcanizing cord tires and Chairman Seger believes these developments mean more to the rubber manufacturer and the user of rubber products of all kinds than anything that has been accomplished in the rubber industry since vulcanization was discovered in 1839.

Sprayed rubber is a new method of producing crude rubber from the original latex, spraying the latex into a snow-white mist which drives the water out of the latex when it comes into contact with pure super-heated air. As it comes from the spraying chamber, this sprayed rubber is a mass of clinging snow-white flakes and 100 per cent the pure solids from the virgin latex, it is declared. For it is claimed greater strength than the old method, containing, Seger claims, all the natural strength of the rubber from the original latex unimpaired by chemicals or the effect of machine working.

Web cord is a rubber-webbed sheet of cotton cords with the filaments of each cord impregnated and surrounded by pure natural rubber, doing away with all cross tie-threads and all resistant to flexure within the fabric. In web cord each individual cord is first soaked in the natural rubber latex, which permeates the cords through and through, no chemical solutions of rubber being used.

AJAX ELECTION

NEW YORK, April 26—Ajax Rubber Co. directors were reelected at the annual meeting at which President Weston declared that expenses were unusually high in 1922 compared with sales because of the low price of tires. These prices, he said, were 55 per cent below those of 1920. At the end of the first quarter this year sales on a basis of the 1920 prices were more than \$4,000,000. This was much higher than the sales in the first quarter of 1922, which amounted to five-twelfths of the sales in the whole year of 1922.

U. S. RUBBER ELECTS

NEW YORK, April 27—All the old directors of the United States Rubber Co. were re-elected at the annual meeting which also listened to the report of President Charles B. Steger, who declares no new financing is contemplated and stated that the company is in a sound financial condition.

HOLDS SERVICE CLINIC

MONTGOMERY, Ala., April 28—A Buick "service clinic" was held in Montgomery at the home of the Montgomery-Buick company by the Buick Motor Company. Dealers from Alabama and Georgia and their service managers attended the meeting. The Buick flat rate system was the main subject of the instruction.

Lincoln Highway and Utah Go to Highest Court

DETROIT, April 28—The fight between the Lincoln Highway Association and the State of Utah is going to the highest court for a decision, with Secretary of Agriculture Wallace having the last say. The vital question is whether or not the "main street of the nation" shall be built west of Salt Lake City, making it a transcontinental route, or whether it shall be only a road from New York City to Salt Lake City.

Austin F. Bement, secretary of the Lincoln Highway Association, believes the fate of the great transcontinental route depends upon Secretary Wallace's decision.

It is alleged that Utah's objections to providing a proper Western outlet is "based on the obvious desire to make Salt Lake City the division point of the vast volume of through traffic headed for Southern California, which, if the Lincoln Highway is abandoned and allowed to become impassable in Western Utah, must necessarily turn south at Salt Lake City, traversing the entire length of the State of Utah and then following through 400 miles of the Mohave Desert, touching but a corner of Nevada in its journey to Los Angeles.

SELDEN TO REORGANIZE

DETROIT, May 1—Selden Truck Corp. will be reorganized with A. S. More as president of Denby Motor Truck Corp. to take over the new connection as soon as his successor at Denby is selected. This he declared would probably be between the first and fifteenth of May.

In going with Selden he said he had not determined upon policies he would institute, but said there was splendid opportunities in the truck field for efficiently organized companies and he planned to bring Selden to the front.

No one will be appointed to fill the place resigned by R. H. Salmons, More said. H. T. Boulden will continue as vice president in charge of sales, and W. C. Barry, Jr., will continue as vice president in charge of production.

TIMKEN BUSINESS

DETROIT, April 26—Timken-Detroit Axle Co. business in the first three months of the year approximated \$8,000,000 as compared with \$3,000,000 in the first quarter a year ago, and \$2,000,000 in 1921. General prosperity of the industry and the signing of important new contracts indicate the company will have the best year in its history.

Akron Tire Manufacturers Have Large Surplus on Hand

Production Slowed Down as Mid-Year Slump Comes Earlier

AKRON, Ohio, April 30—That tire companies again have overproduced and have built up an abnormal surplus of tires and that the demand for tires is beginning slowly to diminish is indicated by the fact that several of the major tire companies in the Akron district already are beginning to lay off a few men at a time and are gradually and quietly lowering their daily production tickets.

Records of past years show that the tire industry can usually expect a seasonal slump in sales about May or June or more often in July and August, but this year the spring customer demand for tires has been so unprecedented that manufacturers have claimed a slump period was highly improbable and production has been pushed to the limit in anticipation of a steady demand for tires throughout the summer months.

Just as during the short-lived era of prosperity in the tire industry in early 1920, manufacturers this year have strained their factory forces so as to gain a maximum tire production and have built up finished goods inventories to a point where a surplus of tires again exists. Should there be any sharp falling off in tire sales within the next eight weeks, it is stated, several of the larger Akron companies will be forced to pare their factory forces almost in two, for they already have such surpluses of tires on hand that the oversupply will last through even a sales slump of some months' duration.

Few Stick to Program

A few of the Akron companies at the beginning of the year promised to profit by past lessons and announced that they would attempt to stabilize production and do away with the seasonal production fluctuations. They intended doing this by producing on more or less of an even keel, keeping production at a steady gait and building enough tires during dull seasons, to take care of heavier sales demands during rush periods. However, few if any of them have stuck to such a program and most of them are pursuing a "hand to mouth" policy, letting production fluctuate commensurate with actual sales. Within the past six weeks all rubber companies have broken 1920 peak production records, and have manufactured more tires than were being sold.

With such a situation prevailing, any diminishing of tire sales is bound to cause a serious slump, it is believed by some. It is just such a situation that added seriousness to the 1920 slump for the tire companies had such a surplus of tires that it took a year to absorb the surpluses before production could again spurt.

Portland Looks to April to Be Best Month in History

Many Changes in Dealer Organizations; Sales Increase of 180 Per Cent

PORTLAND, Ore., April 28—Oregon is staging a remarkable rejuvenation of the new car automobile business, judging from the reports of sales for the first three months of this year as compared with last year. During the last several weeks the market has gone ahead by leaps and bounds and indications now are that April will be the greatest sales month in the history of the industry, at least so far as Portland and vicinity is concerned. Many of the leading dealers have reported the month of March as the greatest month in their history in point of sales, but expect April to exceed this by a comfortable margin.

A report just concluded by the M. O. Wilkins automobile information service here discloses that sale of new passenger cars in the state during the months of January, February and March, this year, totalled 7106 cars, as against 2509 cars for the corresponding period of 1922, an increase of about 180 per cent.

Together with the heavy business, there has been a considerable shifting around of the line-up of dealers, which has changed the complexion of the automobile row to some extent. The latest arrival in the field here is the Durant-Steves Motors, Inc., which has taken over the Durant distribution from the Pacific Motors Co. The new concern is headed by "Cliff" Durant and C. M. Steves of Oakland, Cal., and Steves was in Portland to superintend the opening of the branch. S. S. Paxon, formerly of San Francisco, will be in charge. The company will also handle the Peerless line.

Another change is the acquisition by the W. R. Delay Motor Co. of the Gray line. This concern will handle this light car in addition to the Velie.

HAGERSTOWN SHOW

HAGERSTOWN, Md., April 27—With every inch of available space taken, the first automobile show this city has ever had is being staged this week in the poultry building at the Fair Grounds. Mayor Charles E. Bowman, of Hagerstown, officially opened the affair on Monday night.

The show has attracted throngs from many miles out of Hagerstown and indications are that the results will be excellent. The dealers' association planned the show. In the neighborhood of 100 cars are being displayed and in addition there is an excellent showing of accessories of all kinds.

THESE DEALERS ORGANIZE

ROCHESTER, N. Y., April 28—Automobile accessory dealers, battery, ignition, garage and service men have organized an association with the object of promoting "more friendly business rela-

tions, mutual confidence and good will among its members and the establishment of the automotive equipment business on a firm, stable basis."

The new association is known as the Rochester Allied Automotive Association. At a meeting held last night the members decided to put on a campaign to bring into the association every one of the more than 300 automotive equipment dealers in Rochester and vicinity.

Ford to Build Another Large Plant at St. Louis for West

DETROIT, April 30—Ford Motor Co. is planning a large development of its assembly facilities in the St. Louis district, but pending the selection of a plant site and completion of preliminary details, the company will make no statement as to the extent of its development.

The St. Louis development will rank with the St. Paul project in size and will be the next big activity undertaken. The present plant in St. Louis will be superseded by the new factory, which will be more modern in construction and designed to meet the greatly increased business in that territory.

SHOW PLEASES DEALERS

PEORIA, Ill., April 27—The members of the Peoria, Illinois, Automobile and Accessory Association, are well pleased over the known results of the recent show held at the Inglaterra dancing pavilion. No less than thirty-seven cars were actually sold at the show, a record never previously equalled in that city, even in the flush times of the recent war. The dealers also were impressed with the fact that the patrons of the show were not attracted by motives of curiosity or to participate in the dancing, but rather appeared to be animated with a desire to buy a car. More real prospects developed during the show and immediately afterwards than was the case at any previous exhibition of the kind by the Peoria dealers and they are confident that a vast amount of new business was secured and spring trade given a noticeable stimulant.

ELECTRIC TRUCK SHOW

NEW YORK, April 28—The annual New York Electric Truck show will be held during the week of June 4 in the show room of the New York Edison Co., at the same time the National Electric Light Association holds its convention. At the show there will be exhibits by all the manufacturers represented in the metropolitan territory. The convention which will be held at the Hotel Commodore will devote one of its sessions to electric truck discussions.

TO CARRY ON

DETROIT, April 30—The Security Trust Co., receiver for C. H. Wills & Co., has been authorized to carry on the Wills-Sainte Claire business and make all necessary commitments to June 15. There are 500 unfilled orders on hand.

Wisconsin April Sales Keep Close to Last Year's Mark

Dealers Report That Sales in Most Instances Are Passing 1922 Figure

MILWAUKEE, Wis., April 30—Retail sales of passenger cars in April exceeded those of the corresponding month in 1922 in almost every instance, it is found from a canvass at the close of the period of representatives of standard and established makes who have a history which makes fairly accurate comparisons possible. Despite the fact that the average temperature of the month was below the normal, and around the middle of the month there was a belated blizzard, deliveries were above the average of last year.

Several dealers say that the actual number of sales made in April were just about equal to those made within this month last year, but deliveries were considerably larger, owing to the fact that contracts closed in January, February and March, for April and May delivery, were heavier than in the same months in 1922. In other words, selling was well distributed through months commonly known as dull, while last year contracts made in the first three months were of small volume, the demand starting early in April and running through May and June, then slowing up gradually until the end of the year.

May Sales to Exceed April

There is a very tangible and definite prospect that sales in May will exceed those of April and represent a material gain over May, 1922. Prospect files, after close analysis and elimination, give reason for this confidence. Solicitation during April revealed that a large number of prospects desire to buy new cars, but have held off because of unsatisfactory allowances on old cars. On the other hand, some sales materialized because of the upward tendency of new car prices, which would not make allowances on the old vehicle higher.

The ease with which a buyer is able to get possession of a new car on the "pay as you ride" plan is responsible for many sales in the medium-priced car class, not alone in the low-priced class. A good many families are committing themselves to purchases on deferred payment contracts who six months or a year ago were less secure as to steady income and ability to pay. This is due to the general employment of all classes of labor, and the tendency toward increased wages and the stability of jobs.

Acceptance companies are doing a rushing business and report that the number of failures which may require repossessions is the smallest they have yet known, being almost negligible. This is regarded as testimony to the stability of the general situation and sustained buying power and pay-ability.

Chicago's Used Car Show to Go Down as "Best on Record"

Demand for Used Cars Is Brisk as Show Gets Under Way

CHICAGO, May 2—The Chicago Automobile Trades Association's Sixth Annual Used Car Show opened April 25 to what was pronounced a record attendance. Both afternoon and evening, of the opening day, witnessed many interested spectators and prospects slowly looking over the offerings of the many exhibits. Newspaper advertising, both by the association and the dealers exhibiting, has attracted wide attention to this year's show.

Chicagoans, however, are well sold on the annual used car show and look forward to it with a view of buying. They know that the association's inspection plan is a guarantee that means they are going to get their money's worth and there is little of the old-time suspicion of gypping.

A new and improved brand of salesmanship is also being exhibited. Truth is the outstanding part of the salesmen's talks. Men were heard to be discussing the used car situation quite frankly with interested people. That there has been a real demand for used cars here in the past month and that that demand is gaining daily in strength, cannot be denied.

An advance showing of certified models such as are on display at the Coliseum, in the show rooms of the dealers resulted in a decided improvement in used car sales and in gathering prospective purchasers. Until May 3 (nine days) the show is scheduled to go on. Cars that are sold will be removed immediately to make room for others coming in.

From \$225 to \$6000 is the range of prices and all are pronounced "good buys" by those looking at them. It is interesting to note how much public confidence the Chicago association has won at these annual shows. People look at the association's tag and take what is on there for the last word. They listen to what the salesmen say and not one on the floor seems to be of the "looker-on" type.

One of Last Year's Cars Attracts Attention

A display that is attracting wide attention is that of a car sold at last year's exhibition. The car, a 1919 model, had been driven 30,000 miles before being entered in the show last April. Since then it has been driven by its new owner 34,000 miles through the south and Mexico and back to Chicago. It is still in fair running condition and during the jaunt to the south gave very little trouble to its driver.

Harry P. Branstetter, chairman of the show committee, says that this year's show cannot help being counted as the best on record. Thirty-three members of the association are exhibiting cars and

all are well pleased with the early returns. Something akin to a scarcity threatens if the demand for used cars continues at its present high rate. People at the show, as well as in outlying districts, are buying 1922 used cars with little or no hesitation.

One dealer who a month ago had a vacant lot filled with used cars now has but three remaining, and these, he declares, he would not sell as he is going to rebuild them and put on new bodies. Everyone at the show is "on their toes" and looking out. Salesmen know that people who are there are there to talk business and can be sold a car if the one at their exhibit happens to strike the prospect's fancy.

Columbus and Ohio Sales Run Good, Used Cars Poor

COLUMBUS, Ohio, April 28—Distributors and retailers of automobiles in practically every class in Columbus and central Ohio territory report sales of new cars fully up to the records of the past month and in many instances above it. There is not any appreciable falling off in demand in any way with the possible exception of the highest priced which are showing a slight hesitancy. All other lines, including the cheaper cars, the medium priced vehicles and the better grades of automobiles are moving well.

One of the worst features is the fact that used cars are not selling as well as formerly and this may have a tendency to slow up business in new cars to a certain extent.

Used cars are accumulating to a certain extent and some sacrifices are being made to dispose of them. Relative to used cars, the closed models are selling the best by far and thus the open car is the glut in the used car market.

Cars selling between \$800 and \$1500 are having the best demand, with the exception of the cheaper lines.

Closed cars average about 40 per cent of the sales and open models about 60 per cent. But in certain lines the percentage is different and more closed models than open models are being sold. There is practically no stocking of cars in this territory, as dealers are having difficulty in getting sufficient cars to take care of the trade. Country districts which have not been the best are showing up slightly better, as farmers are more prosperous.

USED CARS SOLD AT AUCTION

BALTIMORE, Md., April 28—Fox Motors, Inc., local distributor for the Cole and associate Hupmobile dealer, recently sold 22 used cars at public auction. This was in the nature of an experiment which according to Louis Fox, president, was entirely satisfactory. Twenty-two cars were sold to a crowd of about 300 bidders. Prices brought by the first two or three cars were rather low, but after that bidding was more spirited. Fox has stated that he will endeavor to have all dealers in the city unite in a huge auction sale of used cars.

Labor Shortage Is Felt at Wisconsin Automotive Plants

Demand for Equipment and Cars Brings Production Up to Rate

MILWAUKEE, Wis., April 30—The situation of the automotive industries in all its phases has settled down to the point where the shortage of labor is a dominating factor, for it is discouraging expansion of production fully justified by the insistent demand, particularly for units, parts and equipment. Without a supply of labor to draw from, and no immediate basis for hope of any improvement in this respect, the strong temptation to enlarge shops to better meet requirements of customers meets strong resistance.

So far as passenger car manufacturers in this district are concerned, demands from distributors and dealers are in excess of the ability to make and deliver vehicles. In nearly every case, distributors are asking for more cars than contracts specify. Unofficial announcement already has been made by several concerns that they will not attempt to go beyond the schedules of production of passenger cars fixed at the beginning of the season or the year, for the 1923 production period, notwithstanding the fact that sales are running considerably above these limits.

This note of caution has been sounded as well in the parts and equipment industries locally. Some of these concerns say they have a demand for anywhere from 25 to 75 per cent more volume than their present facilities and available labor supply makes possible. There are two main reasons why there is no disposition to enlarge shops to provide additional capacity which current trade would absorb readily. One is that skilled men are not available and common labor is going into outside jobs at premium wages offered by contractors, making it useless to attempt to man increased production area. The other is that manufacturers are unwilling to build up a relatively vast amount of new capacity which later may become as a white elephant on their hands, which was an experience of three years ago.

TRACTOR RECEIVES BOOST

DES MOINES, Ia., April 30—The tractor business has received another boost if figures recently obtained by the extension department of Iowa state college on the cost of keeping horses are correct. Investigators found that the total yearly cost of keeping six horses on farms of approximately 160 acres amounted to about \$600.

The net cost per horse was found to be \$99.21. During the year, each horse worked on an average of 723 hours. Figuring on the basis of a ten-hour work day, the average cost was \$1.37 per day or 13.7 cents per hour of actual work done.

CONCERNING MEN YOU KNOW

C. S. Hoben, formerly connected with the Ford Company of Canada, Limited, has been appointed sales manager of Studebaker Corp. of Canada. Hoben succeeds W. G. Palmer, who has resigned.

Harry U. Sharp has been appointed sales manager of the Marmon-Philadelphia Co., distributor of Marmon cars, 847-849 North Broad street, Philadelphia.

J. H. Masterson has been promoted to sales manager by Herbert Bros., Chandler and Cleveland distributors, Philadelphia. James A. Sterling has been appointed retail sales manager. The company has just removed to its new building at Broad and Master streets.

George F. Wright has been appointed manager in charge of the wholesale division, by the Kirby-Davis Co., North Broad street, Philadelphia, distributor of Anderson and Liberty Sixes. Wright formerly was vice-president of the Seaboard Sales & Service Co.

Harry Dobles has resigned the position of service manager at the Packard branch in Springfield, Mass., to accept a similar position with the Packard-Rochester Motors in Rochester, N. Y. The office of president of the Springfield Automotive Service Assn., made vacant by the departure of Dobles, has not been filled.

H. F. Fahrenkrog, president of the St. Louis Automobile Dealers' Assn., recently elected a member of the St. Louis, Mo., School Board, will address the Safety Council of that city on co-operation of public school authorities with the St. Louis Safety Council.

Colonel Fred Cardway, formerly vice-president and general manager of the Packard Motors Export Corp., has been appointed director of exports for the Haynes Automobile Co. His headquarters will be at 342 Madison avenue, New York City.

Harry B. Marshall, president of the Marshall Electric Company of 3225 Locust street, which recently moved here from Chicago, said he has placed 16 Marshall constant potential battery charging systems in use in St. Louis. Marshall, before engaging in his own business, was for approximately ten years St. Louis manager for a battery concern.

Charles B. Shanks, formerly with the Snodgrass-Gayness advertising agency of New York City, has been elected vice-president of the Zimmer-Keller agency of Detroit, and placed in charge of the Cleveland office and handling the Cleveland Tractor Co. account.

Stanwood A. Morrill of Boston has been appointed district sales manager of the Haynes Automobile Co., his territory taking in St. Louis, Little Rock, Kansas City, Denver and Oklahoma City. Morrill comes from the Toledo Scale Co. and prior to that was district manager for the Tyer Rubber Co., traveling Oklahoma, Texas and California.

Thurman W. Holloway, who has been in charge of the school for technical and mechanical construction conducted by the Cadillac Motor Car Co. at its factory, has returned to his former position as assistant technical manager with Ernest C. Garland. William H. Holmes, whom he relieves, has undertaken special duties in assisting Lynn McNaughton, general sales manager, and Jay W. Dunivan, manager of distribution.

E. G. Vestal has been appointed western district manager of Corduroy Tire Co., with headquarters in San Francisco. He was formerly general western manager for Madison Tire & Rubber Co. and was general representative of Racine for four years.

W. P. Loveless has been advanced from sales manager of the William H. Johnston Manufacturing Co., of Chicago, to the position of assistant general manager. He is succeeded as sales manager by C. B. Johnston, who has been eastern representative of the company for the past year.

Frank J. Mooney of Detroit, for the past fifteen years associated with the industry as factory executive and later in the advertising agency business where he handled such important accounts as Studebaker, Firestone and Oldsmobile, has formed the Kelsey-Mooney-Stedem agency in San Francisco, taking over the business of the Advertising Service Co. The new company will handle only national and sectional business.

Paul P. Martin, formerly of the Green-Fulton-Cunningham agency, has been appointed assistant advertising manager of the Michigan State Automobile School of Detroit.

Frank Warrington has been appointed sales manager of the Denby Motor Truck Corp. Warrington, several years ago, was assistant sales manager and service manager of the Denby company, going from those positions to affiliation with the Defiance truck, following which he joined the Republic forces. Now he is retiring to his old company.

William L. Johnson, president of the Johnson Automobile Company in St. Louis, Mo., distributor for the Ford and Lincoln cars, was elected director of the Grand Avenue Bank of St. Louis.

Raymond B. Lawton, former partner in Lawton & Co., Rockford, Ill., grocer, has disposed of his interests to join the sales force of the Automotive Sales Corp. He will handle the Maxwell car, according to Ira Bell, the corporation's head.

R. R. Safford, formerly of Fort Wayne, has been appointed manager of the S. F. Bowser & Co., of Texas, with offices in Dallas, to succeed L. P. Murray, who has resigned to enter a different line of work. Safford has been connected with the Bowser company for some time and was recently manager of the Minneapolis branch of the concern. R. G. Conklin, salesman, has been appointed manager of the Minneapolis branch to succeed Safford. I. D. Bone of Minneapolis will be Conklin's assistant.

Fred Crosby has been appointed production manager of the Wayne Tank and Pump Company, effective at once. Crosby fills the position made vacant by the resignation of B. Sayles.

Charles S. Dahlquist has returned to his former connection with the Timken-Detroit Axle Co. Dahlquist will cover for the Timken company the central territory including Michigan, Ohio, Western Pennsylvania, Canada and part of New York state.

A. B. Hance, formerly covering the Northwest territory for the Cuno Engineering Co., of Meriden, Conn., has been appointed general sales and advertising manager for the company, which manufactures the Electric Match and other electrical automotive products.

tion, Columbia axles, Blood Bros. universal joints and propeller shaft and a Reed steering gear which has been especially developed for taxicab service.

The body is made of kiln dried hard wood which is covered with a compound of creosote before being metalized with 20-gage rivetted sheet steel. The upholstery is in brown Spanish leather and the standard equipment includes a dome light and heater. The carburetor is a Zenith with feed from a Stewart vacuum tank and a 16-gal. tank on the rear of the chassis. The wheelbase is 115 in.

SALON CALLED OFF

NEW YORK, April 28—The Spring Salon scheduled for the Hotel Commodore May 13-20 has been called off for this year. It is planned however, to hold the annual Salon in the fall.

Rollin H. White Heads New Company to Make Rollin Car

Cleveland Tractor Plant to Make Light Weight, Under-\$900, Automobile

CLEVELAND, April 24—A new passenger car designed by Rollin H. White, former vice-president and chief engineer for the White Motor Co., in this city, and for some years president of the Cleveland Tractor Co., will be put on the market. It will be manufactured in the plant of the Cleveland Tractor Co. The car will be a four-cylinder and will sell for less than \$900 list, and it will be made by the Rollin Motor Co.

The \$5,000,000 plant of the tractor plant is equipped to swing into production of the new car at an early date.

Directors elected were: Rollin H. White, R. T. Hodgkins, R. T. Sawyer, E. E. Allyne, Fred W. Goakes, R. B. Tewksberg, Warren P. King, E. W. Moore, Joseph H. Champ and E. R. Smead.

Stockholders of the Cleveland Tractor Co., at their annual meeting here, directed that a contract be entered into with the newly organized Rollin Motor Co., for a lease of the plant of the tractor company and as soon as possible to begin quantity production of the new car. The Cleveland Tractor Co. will not lose its identity under the new arrangement except that the Cletrac tractor and Rollin car will be made by the Rollin Motor Co.

At the stockholders' meeting, White and R. T. Hodgkins, vice-president and general manager, stated that the more than 800 Cletrac dealers would readily absorb more of the car product than could possibly be produced. Hodgkins stated that from ten distributors' territories he already had received dealer applications aggregating orders for 8000 Rollin cars.

The Rollin has several interesting features in design, such as spring construction which makes for a three point frame suspension. In tests it took all stunt hills near here on high and at exceptional speed.

REPUBLIC RUBBER EARNINGS

NEW YORK, April 30—Republic Rubber Co., Youngstown, Ohio, reports sales for first quarter 1923 show increase of 54% over first quarter 1922.

March, 1923, sales show increase of 52% over February, 1923. This is largest month in net sales since October, 1920.

Automobile tire department working to capacity—3 eight-hour shifts.

Sales new stag truck tire show great need for solid-pneumatic tires in truck business.

Demand for mechanical rubber goods unusually heavy, last month company shipped to South Africa one of the largest belts ever made for conveyor installation.

Barley Puts Out Many Taxi Cabs; Is Known as Pennant

KALAMAZOO, Mich., April 30—The Barley Motor Car Co. has gone extensively into the manufacture of a taxicab called the Pennant taxicab. A number of these have already been delivered to operators and are in use in some of the larger cities including New York. The cab has been designed entirely for taxi service and does not resemble in any particular either the Roamer or Barley six passenger car.

Among the special features are an 8-in. frame, boiler plate running boards and disk wheels. A number of standard parts are used, including a Buda 4-cylinder engine, 3 1/4 x 5 1/2, Modine radiator, Fuller 3-speed gearset, multiple disk clutch, Splittorf aero type magneto igni-

BUSINESS NOTES

The Royal Palm Rubber Co. has been organized and incorporated at Kelsey City, Fla., with a capital stock of \$100,000, and plans the construction this spring at that city of a plant for the manufacture of tires. Daily output of the factory at the outset will be about 50 finished tires, according to C. F. Laughlin, of Salisbury, N. C., who heads the company as president and manager.

The Kleiber Motor Truck Co., which established a southern branch plant in Atlanta at 455 Peters street, about two years ago, and which has been operating the plant steadily ever since, is preparing to close the branch and will remove the entire equipment to the parent factory at San Francisco, Calif.

The Camel Chemical Distributing Company, of Dallas, Tex., has been organized for the purpose of manufacturing and distributing a battery solution. F. L. Suber has been named general sales manager and The Nash-McLarty Motor Company Dallas distributor. The company will operate in four states.

The Canton-Akron Trackless Coach Co., of Canton, O., has been chartered with an authorized capital of \$50,000 by H. A. Staley, Andrew Nickas, Sergey Novoskolsky, Alexander H. Slavin and Eva E. Schuster to buy, sell, lease and rent passenger automobiles.

Erd Engineering Co., of Cleveland, has been chartered with an authorized capital of \$25,000 by A. J. Blackford, H. S. Erd, Mrs. E. B. Green, Mrs. Louise L. Loller and C. A. Loller to manufacture and deal at wholesale and retail automobile accessories, equipment and parts at 6715 Carnegie avenue.

Hillsboro & Cincinnati Bus Co., of Hillsboro, O., has been incorporated with a capital of \$4,000 by I. L. DeHaas, B. E. Holladay, A. D. Moorhead, John T. Ridgeway and Pearl H. Miller, to own, maintain and operate an auto bus line.

Obenberger Forge Co., Milwaukee, has increased its capital stock from \$200,000 to \$400,000 to accommodate the growth of its business.

Steps to liquidate the business of the Wisconsin Top Co. of Racine, Wis., have been taken by creditors. It is believed that a dividend of at least 10 per cent can be paid on claims. The assets are approximately \$350,000 and the liabilities \$230,000. Milwaukee banks have claims of \$80,000 and Racine banks, \$20,000.

Superior Tool & Die Co. is the name of a new Milwaukee corporation organized with \$20,000 capital by a group of expert tool and die makers formerly connected with large shops locally, who are establishing a new plant and will specialize in products for the automotive industries. The principals are Casimir Janiszewski, 881 Fifth avenue; Edward Biskupski and Ben Kosmatka.

J. G. Hewitt has opened a tire and tube shop at 2034 Harney street, Omaha, Nebr.

D. L. Taylor, of Omaha, Nebr., has purchased the Maggard Battery station and will be known as Taylor's Battery Station, 1121 North 18th street.

A. B. Huddleson and A. Scott, both of Beatrice, have opened an auto paint shop at Fairbury, Nebr.

Laurel Hammerback, of Crofton, Nebr., has purchased the Hilfiker Battery Station. The new shop will be known as the Hammerback Tire Shop.

George Weiser & Son, of Shelby, Nebr., has purchased the Hartson & Hayhurst, also the Overland business and will run the new shop under the name of George Weiser & Son.

D. O. Norris and N. B. Teal, Forrest, Ill., have sold their garage and sales agency on Main street, to Emmons Spencer and Samuel Haab. The new owners plan some extensive enlargements.

Roy Henderson and H. N. Davis, Decatur, Ill., who have been operating the H. & D. garage, have filed a petition in bankruptcy. They listed liabilities at \$4869 and assets at \$1655.

Northern Finance Co. has been organized at

Green Bay, Wis., with \$100,000 capital to handle the large volume of automobile paper now going into outside banking centers. The principals in the new enterprise are J. H. Taylor, Milton Smith, C. W. Lomas and L. J. Peterson.

R. W. Furnas, Brownville, Nebr., has been appointed Durant-Star dealer of his territory.

President James H. Foster of the Hydraulic Pressed Steel Co., Cleveland, O., has announced "Our directors have decided not to take part in the three-cornered consolidation of Detroit Pressed Steel, Parish and Bingham and Hydraulic Pressed Steel Co. We have made arrangements for necessary financing and will continue to operate alone." The companies mentioned have resources of \$30,000,000 and make automobile frames.

Wausau (Wis.) Automotive Dealers' Association has been reorganized and conducted a show at Rothschild Pavilion on April 27, 28 and 29. There are thirty-one members. Frank Morgan is chairman of the show committee.

Northern Transit Co., of Akron, O., has been incorporated with a capital of \$10,000 to own, maintain and operate passenger and freight bus lines. Incorporators are William L. Stouffer, Edna E. Hart, Mary I. Stouffer, Lawrence F. Cunningham and C. H. Smith.

Washington Motor Co., of Middletown, O., which is now located at Eaton, O., has purchased a site here for the erection of a modern plant for the manufacture of Washington cars.

Moline Body Corp., of Moline, Ill., makers of automobile bodies, has extended its plant to a full capacity production with 500 employees on a 55-hour week schedule. The plant is completing 65 bodies a day and orders on hand guarantee continuance of this schedule until August 1.

A. E. Hageboeck, manager of the Frank Foundries, Moline, Ill., has announced program of expansion for the factory which will give 14,000 sq. ft. additional floor space and represent an investment of \$20,000 in the plant. Capacity of the plant will be increased from 20 to 25 per cent and the working force advanced from 75 to 100. Corerom, foundryroom, new carpenter shop, fireproof vaults and storage houses are included.

Ott Rubber Company of Dubuque, Iowa, recently organized for the manufacture of inner tubes for tires, has purchased 2.8 acres at Railroad avenue and Salina street from Dubuque for \$10,500. It is announced that work on the factory will be started within a short time.

Fichten Traction Lug Co., of Davenport, Ia., has been incorporated to manufacture and sell motor vehicles, tractors, and other devices with a capital stock of \$10,000. It will develop patents along mechanical lines and, it is announced, expects to open a factory in this city before the summer. Robert C. Anthony is president and treasurer and Frank M. Fichten, secretary of the organization.

Court Avenue Garage at Fourth and Court streets, Memphis, Tenn., is quite active. They are in the very central district of the city, and do a general business of storage, washing, polishing and the handling of oils and gas.

Bennett's Auto Laundry has opened on Monroe avenue, Memphis, Tenn., a short distance from Fourth street, and is thoroughly modern. It is owned by a new Memphis corporation of young business men.

Pharis Tire & Rubber Co., of Newark, O., has completed the installation of a new Palmer Bee system of curing which has increased the capacity of the plant about 1200 casings daily. The company was organized in 1912 and the officers at that time still guide the destinies of the company.

Moller Motor Co., of Lewistown, Pa., manufacturer of automobile bodies, will remove its plant to Hagerstown, Md. The company has purchased ground there, fronting 1000 ft. on the Pennsylvania Railroad tracks, and the first building will be finished on July 1. The Hastings Body Works of Philadelphia is completing several different types of bodies for the concern.

FORD PLAN FOR TRACTORS

CHICAGO, April 30—The Ford five dollars a week plan announced recently by the Ford Motor Co. has been extended to cover the purchase of Fordson tractors. Cards issued by dealers on the new plan have been made to read that any model Ford car or the tractor can be paid for under the plan.

"Asks 'Em to Buy" \$22,000 Worth of Tires in Texas

"Small" Dealer Proves That He Is Not as Small as He Looks

SAN ANTONIO, Texas, April 30—"Ask 'em to buy."

That is the secret of the phenomenal tire business done by H. C. S. Smith of this city during March. He specializes in Firestone tires.

Smith sold \$22,164.54 worth of tires in March. He sold 630 passenger car tires at retail prices and in addition disposed of 228 truck tires at regular retail figures.

During the first fifteen days of April his tire business was greater by a considerable amount than it was for the whole month of April in 1922.

And Smith was still "asking 'em to buy" and they were buying.

In addition to "asking 'em to buy," personally, Smith asks 'em through the daily newspapers. He asks 'em through personal letters. He asks 'em over the telephone. He asks 'em when they visit his place. He asks 'em when he meets them at luncheons. He asks 'em on the street. In fact, he asks 'em wherever he finds them. Smith's idea is to sell tires. He believes he would sell but few if he did not ask people to buy.

Smith backs up his claims for the tires. He makes 'em do what he says they will do. He uses no flashy or impossible advertisements. He just tells 'em he's selling tires that wear and when his tires do not wear he makes 'em good.

Smith expects to continue "asking 'em to buy" and he expects his total business this year to reach \$250,000.

BUSINESS IN BALTIMORE

BALTIMORE, Md., April 29—Unprecedented business marked the first quarter of 1923 with most of the Baltimore dealers. Many of them declare that they did the best business in the history of their firms, not even excepting the peak years in industry when large salaries were being paid.

The improvement is not confined to one class of cars but covers the highest and lowest priced ones and practically all in between. The dealers are elated over the business and are pulling hard for it to continue.

DURANT BANK PLANS

NEW YORK, April 30—In a statement to his stockholders W. C. Durant outlines his plans for the launching of his new bank which is to have 300,000 stockholders. He is not yet ready to announce the personnel of the bank or its name, but a significant paragraph declares that no loans will be made to officers or directors of the bank or to any companies with which these officers or directors are connected in any manner. This is interpreted to mean that Durant will not finance any of his automobile units through the bank.

WHITE HITS GREAT PACE

CLEVELAND, April 29—White Motor Co. business for the first quarter of the year showed an increase in orders of 78 per cent and an increase in truck deliveries of 67 per cent over the first quarter in 1922, according to an announcement made by officials of the company.

IN THE RETAIL FIELD

J. Bryan Yetter and Clarence Wright have opened a "Motor Inn" at Fountain Green, Ill., and will handle auto supplies and accessories in connection with their garage service. Carol Miller of Macomb has purchased the Wright Motor Co. in Fountain Green and taken possession.

Carl Obrecht of the Obrecht Motor Car Co., Fort Madison, Ia., has established the Obrecht Reo Co. in Burlington, Ia., at 115 North Third street. It will be the first Reo agency in this city.

Otto J. Behrens has taken over the Federal truck agency in Davenport, Ia., and his company at 1511 Harrison street will be known as the Otto J. Behrens Federal Truck Co. He will conduct a parts and service department.

S. & S. Motor Company, Rock Island, Ill., has been incorporated with \$10,000 capital stock to deal in automobiles and accessories at 3115 Fourteenth avenue. The incorporators are D. J. Strauch, Frances E. Strauch, P. E. Simmons and Kathryn M. Simmons.

Edson and Feray have taken over the retail sales agency for the Chevrolet automobile in Houston, Tex., and vicinity. In the new arrangement Theodore Bradlow becomes vice-president and manager of the company.

Garford Motor Truck Company, of Lima, Ohio, has appointed the Autry Service Garage, of Dallas, Tex., distributors for North Texas. L. K. Autry is proprietor of the concern which will distribute the trucks in North Texas. O. L. Miller is sales agent.

Eagle Garage Company in Jamestown, N. Y., has bought the plot of land on Washington and Tenth streets adjoining the repair shop of the garage company, and will erect a two-story tile building, to provide more space for auto repair work.

W. M. Armour, district manager for the Republic Rubber Company, announced that he had closed a contract with the Lafayette Tire Co., of 1625 Lafayette avenue, St. Louis, Mo., to handle the Republic tire agency for that city.

Wilson Motor Car Company has leased a new building at 2921-2929 Locust street, which will have a frontage of 110 ft. The Wilson Company is local distributor of the Haynes and Dort cars and it has occupied a portion of the building since 1917.

A southern branch office has been opened in the Healey Bldg., Atlanta, by the Durant Corporation, with Walter Johnson, formerly of San Francisco, in charge as manager.

Carolina Reo Motor Co. has been organized and incorporated at Columbia, S. C., as distributors in the Columbia territory of the Reo car. The capital stock is \$20,000. Standmore Watson, of Columbia, in the automotive business for some years, heads the company.

Franklin Motor Car Co. was organized and incorporated the latter part of April at Mobile, Ala., to act as agents for the Franklin car in the Mobile territory. The capital stock is given at \$12,000, and the company is headed by F. H. Cranston.

Nash Motor Car Sales Company has been organized at Decatur, Ill., with Joseph Riggs as manager, and has opened a sales agency at 241 South Main street.

Constant & Groves, Springfield, Ill., have leased the new building, for ten years, just completed at the corner of Fourth and Jackson streets and will be distributors of Hupmobile, Chandler, Chevrolet and Franklin cars in the Sangamon county territory. The new structure is 60 by 210 ft. and ranks with the finest of the kind in the capital city. The firm has been located for many years at the corner of Fifth and Edwards streets.

Armory Garage Company has been organized at Danville, Ill., with J. B. Johnson as manager, and will distribute the Stearns-Knight car in the Vermilion county territory.

Howard H. Smith, Danville, Ill., has opened a garage and sales agency at 120 North Walnut street, and will distribute the Stutz car in the Vermilion county territory.

Myers & Putnam, Danville, Ill., have taken the distribution of the International Harvester motor truck in the Vermilion county territory and have opened a sales agency at 117 North Hazel street.

Valley Motor Sales Co., of Youngstown, O., has been incorporated with a capital of \$25,000 to buy, sell and deal in auto parts and accessories by George N. Burckhalter, M. L. King, R. Maiden, Jr., Arthur Morgan and F. C. Keith.

Akron Oakland Co., of Akron, O., has been incorporated with a capital of \$10,000 to buy,

sell, deal and repair automobiles and motor vehicles by D. W. Alexander, Grace Alexander, A. J. Alexander, Nona A. Reed and M. R. Reed.

C. M. Gassner and L. H. Meeker have secured the franchise for the distribution of Apperson cars in central and western Iowa. A service station and salesroom will be maintained at 1419 Locust street, Des Moines, Iowa.

Hook & Herriott, agents for Dodge and Hudson cars at Bedford, Ia., have started the erection of a new building on South Court street, Bedford. The garage will be a one-story building of hollow tile.

Cole Westervelt-Wasson Auto Company has been organized to distribute Cole cars in Iowa. The new firm has quarters at 1429 Locust street, Des Moines, Ia.

James J. Pender will erect a new garage in Pittsfield, Mass., to accommodate Barritt's Garage and the Hebert Auto Radiator Works. The building formerly occupied by these concerns is to be rebuilt, and in the meantime they will be quartered in Gregory's Garage.

Sherman Auto Co., Cumberland, Wis., dealer in the Studebaker, Durant and Star, has opened a branch in Almena, Wis., in charge of C. S. Johnson.

Michel Langenfeld, Marytown, Fond du Lac county, Wis., has been appointed distributor of the Delco-Light, pumps, etc., for most of the county and has opened a sales and service headquarters at 14 Western avenue, in Fond du Lac.

Amundsen & Wahl Garage, Blanchardville, Wis., has been dissolved, Ben Wahl taking over the interest of R. A. Amundsen and continuing the business.

Badger Auto Co., Stevens Point, Wis., has been incorporated with \$10,000 capital by N. L. Jacobs, J. K. Turzinski and R. A. Jacobs.

Charles Klundert, Galesville, Wis., has plans for a public garage and repairshop, 50x95 ft., costing about \$12,000.

Arthur W. Hass, formerly proprietor of the Little Chute (Wis.) Motor Inn., has filed a bankruptcy petition showing liabilities of \$1214 and assets of \$935.

T. W. Meiklejohn Co., Fond du Lac, Wis., Ford dealer, has opened a complete radio department and has an exclusive Wisconsin distributing franchise for the Mu-Rad line. Frank M. Yordy has been appointed manager of the department.

Shadbolt & Boyd Iron Co., 129-131 Sycamore street, Milwaukee, a large distributor and jobber of automotive equipment, will build a new warehouse, 150x225 ft., at Dousman and Lee streets, to replace the building destroyed by fire recently.

George Forrand, Wisconsin Rapids, Wis., has been appointed Reo dealer.

C. Manthus Motor Co. 216 Sheridan Road, Kenosha, Wis., will build a one-story brick and steel garage and repairshop, 60x120 ft.

Gill Bros., 214 West Washington avenue, Madison, Wis., have plans for a three-story fireproof garage and service building, T-shaped, 64x264 and 44x132 ft., estimated to cost \$80,000 complete.

Arthur M. Gogin, Red Granite, Wis., conducting a garage and service business, is a voluntary bankrupt with liabilities of \$40,127 and assets of \$51,155, of which \$41,510 represents real estate.

Auto Service Sales Co., Clintonville, Wis., is a new \$20,000 corporation organized by Robert R., Aaron C. and Franklin B. Haase to deal in new and used cars, render service, etc.

Finkler Motor Co., 962 Island avenue, Milwaukee, is having plans made by H. B. Kamshulte, consulting engineer, for a three-story garage and service building, 60x150 ft., at Third and Wright streets, estimated to cost \$60,000.

John VanderVaart, Sheboygan, Wis., will remodel and enlarge the present Sheboygan Opera house into a four-story garage, service shop and apartment building, 60x120 ft., at a cost of \$50,000. Work will begin June 1.

Frendle Bros., Medford, Wis., will build a new garage and repairshop costing \$22,000.

Field Motor Co., Rice Lake, Wis., has incorporated for \$50,000. T. H. Field, Ray C. Peck and Thomas W. Quinn are the incorporators.

William F. Bureske, Madison, Wis., has been granted a permit to build a \$40,000 public garage and service building at 2808-2810 East Washington avenue.

J. H. Lawwill of the Motor Mart Automobile Company, of Springfield, O., has closed a deal by which he has leased a tract of ground in East Main street for a filling station and gas-

oline storage tanks. The site is 63 by 210 ft. Tracks will be laid from the Big Four railroad so that there will be excellent rail facilities. A new company will be organized by Mr. Lawwill to operate the business, he states.

Perdue Motor Sales Co., 5308-10 Broadway, Chicago, has been incorporated with a capital of \$10,000 to manufacture and deal in automobiles and motor vehicles, etc.

Modern Auto Sales Co., 308 N. 15th street, Herrin, Ill., has been incorporated with a capital of \$10,000 to do a general garage business.

Handy Accessory Mfg. Co., 105 Main street, Peoria, Ill., has been incorporated with a capital of \$2000 to manufacture and sell automobile supplies and accessories.

P. A. Bair of New Martinsville, W. Va., has been appointed dealer for the Auburn car.

Brook-Wyatt Motor Company has been appointed dealer in Uniontown, Pa., for the Auburn car.

F. L. and A. J. Watson have been appointed dealer for the Auburn car in West Monterey, Pa.

Victoria Auto Company has been appointed dealer for the Auburn car in Fredericktown, Pa.

McClellandtown Auto Co. has been appointed dealer for the Auburn car in McClellandtown, Pa.

Brookville Auto Co. has been appointed dealer in Brookville, Pa., for the Auburn car.

Clifford Hilkert, of Logansport, Ind., has taken the distributorship for the Auburn car in that territory.

National Auto Sales Company, 1324 Broadway, has taken over the distributorship in Denver, Colo., for the Auburn car.

Oakland-Lakewood Co., of Lakewood, O., has been incorporated with a capital of \$15,000 to buy, sell and deal in automobiles.

Colonial Tire Sales Co., of Canton, O., has been incorporated with a capital of \$5,000 to buy, sell and deal at wholesale and retail in tires and tubes.

Dixie Motor Sales Co., of Cambridge, O., has been chartered with a capital stock of \$50,000 to deal in motor vehicles, accessories and parts.

Lima Automobile Tire Dealers' Association of Lima, O., has been organized here with a membership of 20. The president is R. A. Conroy of the Lima Tire & Supply Co., and the secretary and treasurer is O. L. DeWesse. A resolution was adopted whereby the association will co-operate with newspaper advertising managers in the preparation of advertisements to prevent the publication of misleading advertising.

B. S. Hayes has been appointed dealer for the Auburn car in Fairhaven, Vt.

John F. Steel Motor Co., 915 Northampton street, Easton, Pa., has been appointed dealer for the Auburn car.

Young & Finney Motor Sales, 11347 Cottage Grove avenue, has been appointed dealer for the Auburn car in Chicago.

New Orleans Fashion Show Has Big Attendance; Prizes

NEW ORLEANS, April 29—More than 10,000 persons attended the Elks' Automobile Fashion Show held at the Fair Grounds race track early this month. It was said to be the largest crowd attracted to a similar event in this city. The show is an Easter classic of long standing in New Orleans, and it has become almost a custom of the city.

Lincoln cars entered by the Jarreau Motors Co., won two first prizes out of four classes, and one of these entrants also won the grand prize of the show. A Lincoln touring car won the cup in its class, and the grand prize, while a Lincoln limousine won the cup in the enclosed car class. A Studebaker won the cup in the roadster class, and the sport model class cup was won by a Dodge.

More than 100 cars were entered in the show. But few of these, however, were official entries of dealers. Most of the entrants were private, but dealers of these cars were enthusiastic.

The READERS' CLEARING HOUSE

Questions & Answers on Dealers' Problems

Aligning Rods on a Tapered Crank Pin

Q—Explain in detail the best way to line up connecting rods and piston with aligning tool and without. A, claims that the aligning tool is of no use if the crank pin is tapered. B, claims it will not change it, if the bearing is fitted first on the crankpin then lined up. A, also states that the small end of the rod should be between the piston bosses and not nearer to one side. B, states that it does not make any difference if the rod does not touch the boss.—M. D. Vail, Schenectady, N. Y.

The aligning of connecting rod bearings should begin with testing of the crankshaft. If the crankshaft crankpins, are not eccentric and not tapered, it is not necessary to line the rod after it has been aligned in a jig. However, if the bearing has been scraped to a crankpin that is tapered, there is a possibility that the rod when tested on an aligning jig will show an out of line condition. The correct way then to align any connecting rod is first to test it on the aligning jig after the crankshaft has been tested and then to give it a final testing when the rod is installed on the crankshaft.

The test with the rod installed on the crankshaft may be made with an ordinary try square mounted on a flat surface. "B's" contention that it does not make any difference if the rod does not touch the piston boss is incorrect, as it is advisable and necessary that the small end of connecting rod have at least .010 clearance between the bosses. The ideal condition is to have the small end midway between each boss, with about the same clearance on each side. The absolute center position between the bosses is not absolutely necessary and as long as the small end does not touch the piston boss at any time during the revolution of the crankshaft, the rod may be called O. K. for alignment.

MAGNETIZING FORDSON MAGNETO MAGNETS WHILE IN ENGINE

Q—Give method of recharging magnets in a Fordson tractor without taking them out of the engine.—Illinois Subscriber.

The terminal of the magneto is located at the left side of the engine, but, due to the iron of the transmission housing, it is practically impossible to get a definite compass reading for the purpose of setting the flywheel properly.

One of our readers has worked out a method which can be used with success if the operator is very careful. This method involves removing the spark plugs so that the engine may be turned over easily by hand. A 6-volt battery is then used with the positive end con-

The Readers' Clearing House

THIS department is conducted to assist dealers and maintenance station executives in the solution of their problems.

All questions are answered direct by letter, so the name and address should be given in full. This saves waiting for the answer to be published, which sometimes occurs several weeks late, depending upon the space available.

Readers' names will not be published with articles, if a request to this effect is received with the letter.

Inquiries not of general interest will be answered by personal letter only. Emergency questions will be replied to by letter or telegram.

Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been made and these are answered by reference to previous issues.

Addresses of business firms will not be published in this department but will be supplied by letter.

Technical questions answered by B. M. Ikert, P. L. Dumas and A. H. Packer; Legal, by Wellington Gustin; Paint, by G. King Franklin; Architectural, by Tom Wilder; Tires, by a Practical Tire Man; General Business questions, by MOTOR AGE organization in conference.

nected to the magneto terminal. The operator now places his ear near the flywheel housing and at the same time flashes the negative lead of the battery against the frame of the tractor. While doing this he has a helper turn the engine over slowly.

When the flywheel is properly set there will be a strong attraction between the magnetic effect of the current and the magnets themselves, so that there will be a noise or hammering sound every time the wire is flashed against the frame of the tractor. When in the wrong position there will be no such sound. When the position is reached where the noise is the loudest it shows that the flywheel is properly set. The battery should then be left connected to the magneto terminal and three additional batteries connected in series with it. Flashing this 24-volt string of batteries to the frame of the tractor some 10 or 15 times will then properly magnetize the magnets very strongly

Competitor's Constant Potential Charging System Gets His Business

Q—We are having a lot of trouble with old batteries that will not take their charge as they should. We have been using a 32 volt generator run with a gas engine and some of these batteries we have charged for 100 hours without any results. After the gravity of the acid came up to a certain point it would rise no higher.

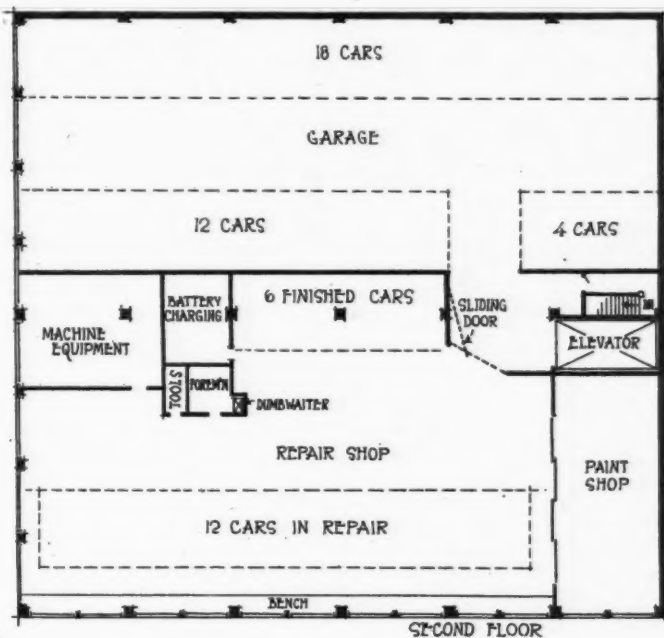
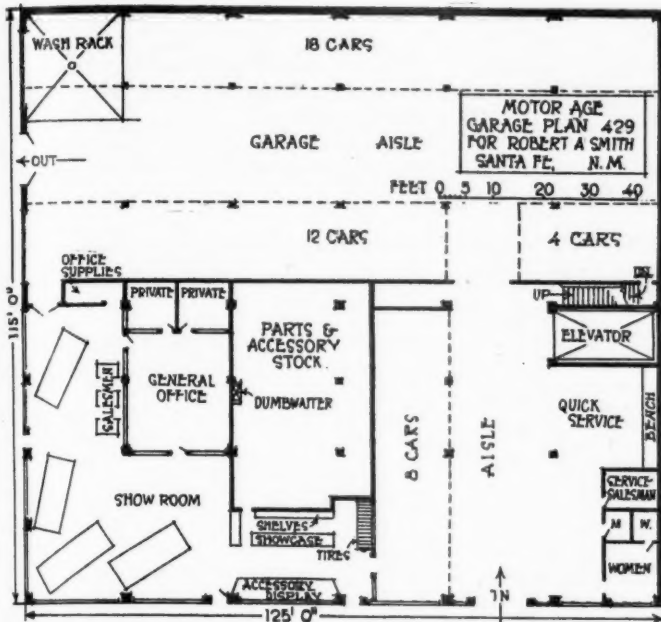
Another garage here has one of those constant potential 8 hour charging outfits and we took a couple of these batteries over to them and the next day they brought them over fully charged. Why is it that they will charge the battery so much quicker? We have tried discharging and adding new acid without much result. Hope you can help us out on this problem.—Ewart Garage, Ewart, Mich.

The constant potential method of charging a battery does the work in less time because the battery is permitted to take a very heavy rate of charge, say 40 or 50 amperes at the start, and automatically tapers down as the battery becomes charged.

It is quite possible, however, that some of your batteries that will not come up are defective, that is, the active material is washed off of the plates or the separators are shorted. If you had a high rate discharge tester you would be able to detect such batteries and save the trouble of charging them when they need overhauling. There is no reason whatever why your continuous charging at low amperage will not bring up the batteries in time, assuming there is nothing wrong with them except that they are discharged.

Your statement in regard to discharging a battery and then adding acid, shows that you are not familiar with battery repair work. Acid should never be added except after the battery has been charged to the point where it gases freely for two or three hours. Then if the gravity is tested and found to be low, it is permissible to take out some of the solution and add acid until the gravity is brought up to 1280 or 1300 in all cells. We would recommend your getting a good battery book and studying it carefully.

Probably you have noticed "Bill Fixit's Return," but did you ever stop to think how many of the very questions put to the Clearing House are answered by this "juice expert"? If you will turn to page 15 of this issue he will give you a lot of information about charging batteries.



Building for Sales, Shop and Painting

Q—We are enclosing herewith a sketch for a location of a garage and we would thank you to look it over and make a suggestion for a building. The size of the lot is 125x115 ft. We would like you to send us a plan. We would like to have the following departments: Shop to work eight mechanics, battery charging, paint shop, showroom for four new cars, accessory and stockroom and floor space for 100 cars. We would like a plan showing the shop on the second story of the rear of the building and a separate plan showing the shop on the main floor.—R. A. Smith, Santa Fe, N. M.

A—On account of the odd proportions of this lot it has been very hard to design a building that would be economical of floor space and at the same time well laid out architecturally and efficient. It is practically impossible to arrange for space enough to garage 100 cars unless three-quarters of each floor is given over to that purpose. As laid out there is space for 99 cars when cars in the shop and paint shop are all counted in, 4 to 6 cars on the display floor and 3 receiving quick service, would make a total of 108 altogether.

Garage spaces 50 ft. in width are the most economical, but here, dividing in two either way makes the space too wide. For the sake of uniform construction we have placed a row of columns through the center the long way of the building. These columns extend up through and support the roof trusses. The other columns are for the support of the second floor only and are placed to facilitate car movement and storage.

In a two story building there is not enough light on the first floor for shop

purposes, so we will not consider your request for a plan with first floor shop. Another consideration is that if you use your first floor as shop space it will be necessary to transfer all the storage to the second floor and that will necessitate raising every car. Second floor storage is unpopular with the motorist and a first floor dark shop is unpopular with the men and tends toward inferior work. These two reasons offset any advantage that may seem pertinent.

The positions of the car display and accessory store might be reversed, but we think it is more advantageous to get the accessories and parts as close as possible to the quick service department where customers are waiting for adjustments. No one who drives a car can wait around in or near a well equipped store without seeing several things he wants and which he will buy if he has the money.

ECCENTRIC COMMUTATOR KILLS GENERATOR OUTPUT AT HIGH SPEED

Q—We would like to know what causes a Northeast generator on a 1917 Dodge to charge from 5 to 8 amperes when the car is running from 10 to 15 m.p.h. and then charge nothing when the car runs faster than that. We have tried holding the cut-out point together, but this makes no difference. We also have trouble due to the lights flaring up and the bulbs burning out at times.—A Subscriber, Gallon, Ohio.

If the subscriber would give us his name he would get an answer much quicker than by waiting for an answer in the magazine. The trouble with the generator is doubtless due to the fact that the armature has been turned without

being carefully centered, so that the commutator is eccentric. At high speed this causes the brushes to fly off of the commutator at times so that the machine will not generate. The remedy is to turn the commutator by mounting the armature so that it rotates in its own bearings.

This, of course, is not a simple job and requires a man expert in using a lathe. It is also possible that the third brush and even the other brushes may not work freely, or that the springs are a little weak so that any slight eccentricity is exaggerated as far as the effect on the charging current is concerned. The cause of the burning out of the lights is in a poor connection between the generator and battery.

If the motor generator never gives any trouble as far as starting is concerned, it eliminates some of the connections. However, if the lights go out when starting button is pressed, it shows poor connection at the battery terminals or at the ground connection. If the starter action, however, is all right, then there may be a connection between the No. 2 terminal on the starter switch and the ammeter.

It is also possible that there is a poor connection inside the ammeter. The ammeter and this one wire to the starter switch cover the range of possibilities. You will probably find a loose connection the source of your trouble.

This inquiry is dated February 5 and is answered February 6, but may not be published for a month or so, so that the reader is delayed in getting information, due to failing to give his name.

Architectural Service
IN giving architectural advice, MOTOR AGE claims to assist its readers in their problems of planning, building and equipping, maintenance stations, garages, dealers' establishments, shops, filling stations, and, in fact, any building necessary to automotive activity.

When making request for assistance, please see that we have all the data necessary to an intelligent handling of the job. Among other things, we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.
What departments are to be operated and how

large it is expected to be.

Number of cars on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repair shop.

How much of an accessory department is anticipated.

Rotating Gap for Synchronizing the Sparks

Q—I am sending you a rough sketch of a rotating spark gap which I have made. The aluminum ring is insulated and calibrated in degrees and is stationary. The steel pointer rotates and is grounded. A high tension lead is run from the center of the distributor plates to the aluminum ring. The object of the apparatus is to determine if the sparks are synchronized and also to measure the advance and retard and lag, if any, at various speeds.

In operation, however, I find that the spark jumps the magneto safety gap and occasionally at "A" rather than at "B" unless I hold this gap to 1/32 in. or less. Why is this? I first used a pointed with a sharp edge and beveled the inner periphery of the ring to a knife edge. Later I ground the end of the pointer round, which materially increased the distance that the spark would jump. Beyond this point, however, I have been unable to progress.

1—You have shown the ground sign that is three parallel lines each one shorter than the other, on the rotating pointer and also on the magneto. We wonder if you have made a connection between the stand on which the magneto is mounted and the stand on which the rotary gap is mounted. It is necessary that these two grounds be connected together by a wire unless they are on the same metal stand. It is also possible that you are using a leather coupling so that the base of the magneto is really insulated from the rest of the ground or stand of your rotary spark gap.

If this is not the case then we have no explanation to offer except the effect of the high tension lead and the insulated ring to act somewhat as a condenser and absorb a certain amount of the energy in this way tending to prevent a spark at the rotary gap. We believe that in general it will be found that the spark prefers to jump at the safety gap or somewhere on the magneto rather than jump a somewhat smaller gap after going through considerable length of cable. You will probably find a similar condition on the car in case you remove a

spark plug wire and hold the terminal near the engine.

Bosch B-6 Magneto

2—Explain how the rotor of the Bosch B-6 magneto is fastened to the distributor shaft and the function of the small screw in the top of the rotor. Also advise how the rotor is timed with the interrupter.

2—The magneto to which you refer is used on Chandler cars and is a conventional magneto except that the distributor looks like a battery interrupter. The interrupter is of the standard type at the opposite end of the magneto from this vertically mounted distributor. On top of the vertical shaft there is a sort of collar or coupling set and this is held on with a screw to which you refer. The top of this coupling has a ridge in it which meshes with a similar depression inside of the rotor or distributor arm. This fixes the location of the rotor or distributor arm with respect to the shaft.

In assembling the magneto it is necessary to mesh the spiral gears which drive the distributor shaft so that the distributor arm will be opposite a segment when the interrupter contacts just begin to separate. This is necessary in both the retard and advance position of the interrupter. Accordingly it will be necessary to have the distributor arm just beginning to come in line with the segment when the points open in the advance position and farther along the segment in the retard position.

Coil Analysis and Testing

3—Show sketches of various standard coils and proper connections thereof.—Walter N. Patterson, Yellowstone Park, Wyo.

3—It is much more essential to be able to test out an unknown coil and know how to connect it than it is to have pictures showing the proper connections. Most ignition coils have the terminals marked as to whether a wire should run to battery, switch, interrupter or other connection. On practically any coil you can look at the terminal and tell which

one goes to the center of the distributor. It is usually at the side of the coil or at the center and often is constructed differently being designed to take the rubber insulated wire.

The next point to determine is whether the secondary is grounded to the base plate or to the primary winding. This can be done with a 110 volt test line with a lamp in series with one lead. If from the high tension terminal to the base plate you can get a faint spark with the test point it shows that the base plate should be grounded or connected to the engine. Otherwise you will find a faint spark from the high tension terminal to one of the other terminals and this means that the coil is designed for a grounded system.

You can then find the primary winding because the 110 volt lamps will light up when the proper terminals are touched. If there is one other terminal which appears to have no connection it is one end of the condenser. You will then find the condenser is from this terminal either to the base plate or to one of the primary terminals.

The test for this is to use your 110 volt line and while it is connected to the terminals where you think the condenser is located make a short circuit or contact across these terminals. A sharp snappy spark like the noise of a whip being cracked indicates you have located the condenser.

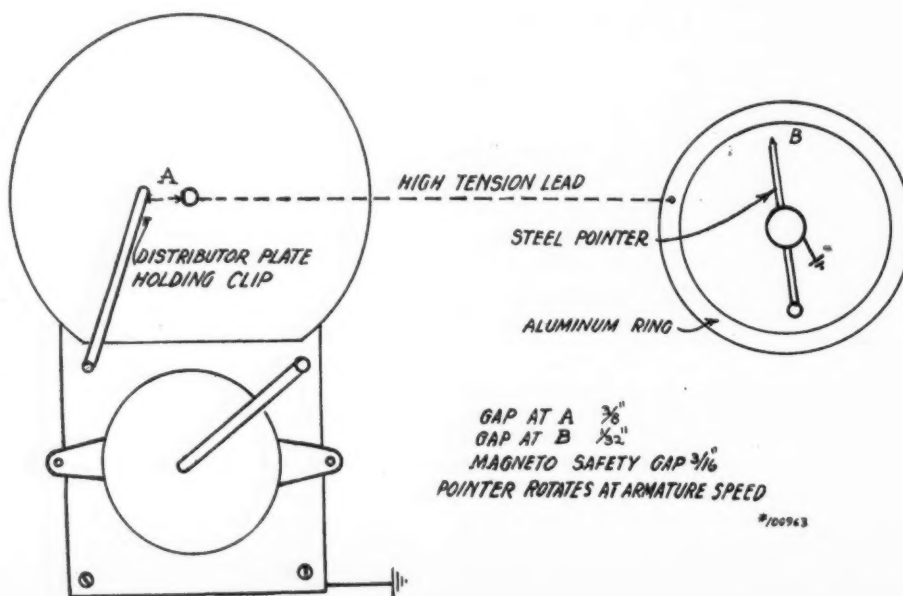
It is well to make a sketch of the coil and as you locate each winding or the condenser draw it in on your sketch. When you have finished you will probably find one terminal which is connected to the primary and also to the condenser. This should be connected to the interrupter. The other end of the primary should be connected to the ignition switch and the other end of the condenser should connect to ground.

If you will follow these rules you will hardly be able to make a mistake in connecting upon ignition coil. The most common mistake on a coil of this type is to reverse the connection of the primary winding. This gives you battery current to the contacts all right but connects up the condenser in the wrong place. The remedy is to reverse the primary connections so as to get the condenser connected across the contacts.

TUNGAR RECTIFIER NOT SUITABLE FOR CHARGING FORD MAGNETO

Q—We would like to know if it is possible to use a 10 battery type Tungar rectifier for recharging a Ford magneto in the car. If this is possible, please advise the exact method of connecting. If we can use the rectifier it will suit us much better than using several six-volt batteries.—N. H. Vanstavern, Sinks Grove, W. Va.

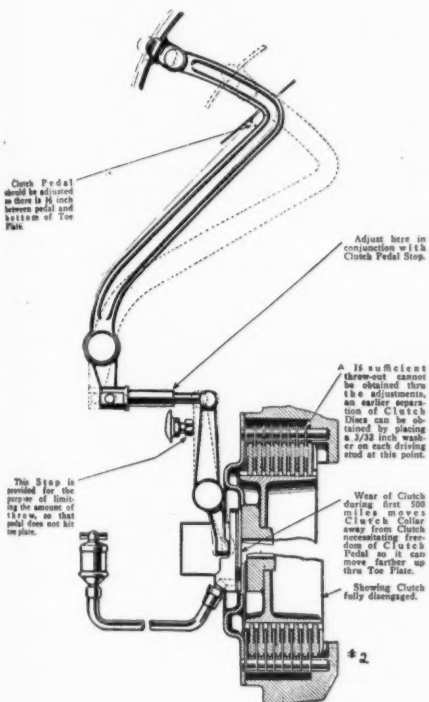
1—The Tungar rectifier is not suitable for this purpose, as it does not deliver enough current. Four 6-volt batteries will send approximately 50 amperes through the windings of the Ford magneto, while a rectifier will send but 6. You can accordingly see that the effect would be weak and practically no benefit would result.



Reader's method of checking magneto on rotary gap

Clutch Shifting Collar May Cause Gears to Clash

Q—We have trouble with a clutch on a 1919 Hudson Super Six chattering when changing gears. I have replaced the old plates with new ones. Print a cut showing the construction of the clutch and order in which the plates are inserted when assembled.—Frank Dierkes, Chicago, Ill.



Clutch assembly on 1919 Hudson

Assuming that the clutch has been properly assembled, clashing gears, in most cases will be found due to trouble at the clutch shifting sleeve or collar. This clutch shifting sleeve acts as the clutch brake as well. A lack of lubrication at this point, or worn thrust washers in this shifting collar are generally the cause. The result will be that when the clutch is released the braking effect is tremendously increased and the clutch plates will therefore stop revolving immediately. The momentum of the car of course keeps the gears revolving and the result is a terrible clash when shifting. We would suggest that you pay particular attention to this point and see that the grease line is entirely clear.

Quite a number of cases have been found where the trouble has been caused by a leak in the grease tubes, and when this condition exists the grease just leaks out of the tube onto the street instead of going to the shifting sleeve. Assuming that the clutch collar, thrust washers, etc., are in good condition, it is always well when turning down this grease cup to lift the clutch pedal up by hand, which will relieve the clutch collar of any pressure and allow the grease to go through freely. The Hudson recommendation on grease is Whitmore's grease or crude petrolatum.

To make this clutch shift quietly, it is also necessary that the stop which is provided for the purpose of limiting the amount of down travel of the clutch pedal should be set properly. The best method of setting this is as follows:

First allow the engine to idle slowly, then move the shift lever so that the gears are just touching and the grating sound can be heard. The shift lever should then be held in this position and the clutch pedal slowly pressed. The exact moment at which the clutch releases can then be found, as the slight grating noise ceases at this point. The clutch pedal stop screw should then be set so that the clutch pedal will still have an approximate $\frac{3}{8}$ in. farther travel downward. The construction of the clutch and the clutch throwout pedal and stop adjustment are shown in the accompanying sketch.

CHARGING OUTFIT MADE WITH A FORD GENERATOR

Q—We want a little advice on operation of generator and battery. We are building a little charging plant using a Ford generator which we run with a small gas engine. It works all right charging 6 volt batteries. At what ampere hour should we charge the battery for an hour or so at a time when the battery is around half charged or better? Should we charge more than one battery at once with this outfit? We wish to give the battery as much current as it will stand so we will not have to run the engine any longer than necessary. How much should the rate be when the battery is down to 1150?—Hunter Brothers, Peever, S. D.

The speed of the generator should be about 1500 r.p.m. and the third brush should be set so as to charge at about 10 or 12 amp. The charging current will vary somewhat, due to the way the third brush happens to be fitting the commutator and due to changes in temperature and variations in conditions of battery charge.

The limiting factor is the heating of the generator and for continuous operation this means that 10 or 12 amp. is the greatest charging current you should use. You can charge a 12-volt battery by charging half of it at a time. You can, however, charge two 6-volt batteries by connecting them side by side, both positives being connected together and both negatives. The 10 or 12 amp. output of the generator, however, will then be split up, going half to each battery, if they are in similar condition of charge or discharge. The 10 amp. rate may be a little too great for a finish charge and will cause excessive gassing and may overheat the battery. It would, accordingly, be well if you have two batteries to charge, to first charge one and then the other up to the gassing point, then put them in parallel and charge them together for the finished run.

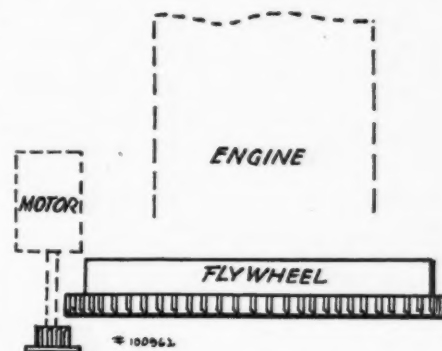
Your use of the term "ampere hour" is incorrect. The charging rate is measured in amperes. For example, if the meter shows the charging rate to be 8

amperes and you charge for 7 hours, then you have put 8 times 7 or 56 ampere hours into the battery.

STICKING STARTER MAY BE DUE TO REVERSED GEAR ON FLYWHEEL

Q—We have been having trouble with a 1920 Ford starter, although everything appears to be in good condition. Once in a while the starter gear will get stuck in mesh with the flywheel and the only way to get it loose is to remove the sheet metal cover over the Bendix and hammer the pinion out of mesh. Advise what to do to overcome this condition.—James Vos, Zeeland, Mich.

We do not recall having such a complaint in regard to the starter on Ford cars. It accordingly occurs to us that possibly some one has had the engine apart and removed the magnets and possibly put the flywheel on backwards so that the chamfered end of the tooth is turned forward instead of to the rear. In the illustration shown the correct location of the ring gear is given. As the starting motor begins to operate the pinion turns in a right hand or clockwise direction as seen from the rear of the car and at the same time starts to move in the direction of the flywheel. As it does this there is a faint chance of the end of the tooth striking the end of a tooth on the flywheel but the chance is very slight so that it practically never happens. This is due to the correct chamfer which allows the flat side of a pinion tooth to drive the flat side of a tooth on the flywheel.



Correct chamfer of flywheel teeth on Ford

When the Bendix drive was first used the mistake was sometimes made of meshing the gears too close and it was later found that a loose or sloppy fit with possibly $\frac{1}{32}$ in. back lash gave best results and prevented the possibility of the teeth binding on end. While we have no recollection of this complaint before on Ford cars it is a possibility that the starting motor meshes too tightly and if there is no trouble with the flywheel it might be well to see if the starting motor can be raised a trifle. This might require filing out the opening through which the starter shaft is inserted when the motor is put on. It might also involve filing the four holes in the end bracket so that the starter can be raised a bit and the screws tightened to hold it in that position.

Allis Chalmers Electrical System on Seneca

Q—We have in our shop a 1920 model Seneca that uses an Allis-Chalmers single-unit starting and lighting system, and on this system we cannot make the generator work. The generator itself seems to be in perfect condition and the starter works all right. The relay also seems to be in good condition, also the connections are O. K. We would like to have a wiring diagram and any suggestions you can give for overcoming the trouble.—Tipton & Tipton Garage, Chadbourne, N. C.

As the starting motor is working it shows that the armature and brushes are probably in good condition. We would accordingly suggest your checking the field circuits and by referring to the diagram you will note that one end of the field winding is connected to the heavy or series winding which in turn is grounded. Checking the other end of the field winding we note that it goes to a terminal marked FLD. and then goes across to another terminal marked FLD. From this point the circuit goes through a pair of contacts on the regulator relay, these being the regulating contacts.

Across these contacts we then trace to the frame of the regulator and through the fuse back to the right side of the starting switch which is connected to the positive dynamo brushes. The first possible cause of trouble that occurs to us is that the vibrating contacts are burnt and dirty and do not make good contact with each other. You can tell this by inspection and might try running a file between the contacts to clean them up and then adjust the spring tension so that they make contact.

Another way to test is to remove the wire from the field post and connect it to positive dynamo. If this small wire is flashed against the dynamo plus terminal you should get a spark with the machine running. If you do not it is quite likely that the field circuit is open. You can make a temporary test with this field wire permanently connected to dynamo plus. Then if you wish you can

make a test by running the engine and at the same time holding the cutout contacts in the relay together. If the generator is in fairly good condition this should cause the ammeter to show charge. With the field circuit previously tested failure to show charge would now indicate armature trouble.

LEAKY PISTON, LOOSE BEARINGS AND MAGNETO DEAD

Q—Rush us your version of how to eliminate following trouble on a Ford roadster: This car stopped while driving along the road and we finally got it firing on one and two. It then went dead and has been dead ever since except when attached to a storage battery.

We could only get a spark from the magneto to engine block by grounding the magneto wire to the engine when trying to crank on magneto. Some of the pistons are leaking badly. The space between magnets and field coil varies, being in some places $\frac{3}{4}$ of an inch and in some places it drags. There are loose bearings in this engine. Would attaching a storage battery to the magneto post of such a car demagnetize the magnets, and how long would it take to do so?—A Texas Subscriber.

From your description we would say that the car in question needs rebuilding or at least a very thorough overhauling. The condition of the main bearings will affect the operation of the magneto as the rear main bearing cap holds the crankshaft in its proper location and maintains the proper air gap between magnets and field poles.

You can accordingly see that you can get no satisfactory operation from the magneto as long as the bearings are in bad condition. If the pistons are leaking badly you should have the cylinders checked to see if they are out of round or unduly worn and if so it might be necessary to have the cylinder block reground and new pistons and rings fitted. You should also have the main bearings taken up and properly adjusted, preferably by some good Ford service station. Then when you have the bearings in good condition and a new rear main bearing cap installed you can ad-

just the air gap between the magnets and the magneto to approximately $\frac{1}{32}$. Less gap than this may be used, just so the magnets do no drag on the field poles.

Answering your question as to the storage battery would say that there is great possibility of demagnetizing the magnets unless you are very careful. We are sending you by separate letter instructions for remagnetizing the magnets in the car. After you have put the engine in good condition and remagnetized the magnets, believe you will find the operation O. K.

We might also suggest that when you have the engine apart you examine the field coils very carefully to see if the insulation is rubbed off, and, if it is, the coils should be removed and carefully taped up.

MAIN BEARINGS ON 1913 BUICK

Q—We have a model 30, 1913 Buick roadster and want to take up crankshaft bearings, especially the end bearings. The engine in this car is the same as in the model 31 touring model of the same year. Tell us how to go about this job, also give us sketch or illustration and how to take the crankshaft out.—Leroy Stuckey, Paris, Stark Co., Ohio.

We do not believe that a sketch will be necessary to enable you to remove this crankshaft. The first step is to remove the engine from the frame. After taking down the oil pan, remove the front gear case cover and take off the gears from the crankshaft and camshaft.

The front bearing bushing is solid; that is, it is not adjustable, and is pressed into the plate in the front end of the crankcase. The two rear bearings are the conventional split adjustable type. After removal of the gear and the two bearing caps at the rear, you can withdraw the crankshaft toward the rear. It is recommended that these bearings be fitted with a little more clearance than would be given to the ordinary splash lubricated engine, .001 of an inch diametral clearance is recommended especially at the front solid bushing.

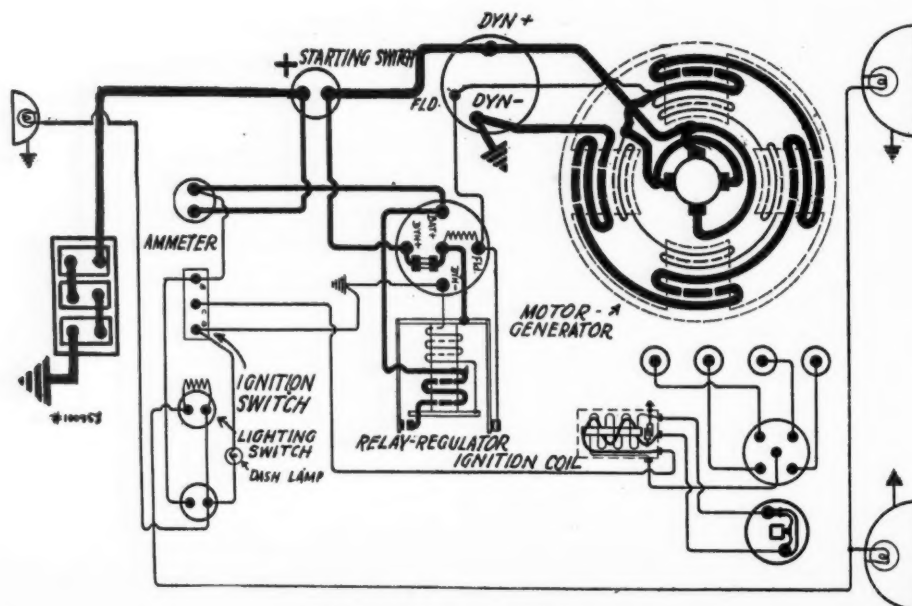
SMOOTHING BODY WORK

Q—What is the best method and material to use in smoothing up a body that has been straightened up after a wreck and shows hammer marks and small indentations?—E. R. Stockwell & Son, Mechanicsburg, O.

The usual procedure in smoothing up a body that has been hammered or bumped after repairs is to fill the depressions with solder and then file this solder down to the level of the surrounding metal. It will be necessary of course to give the body panel a coat of acid to clean it so that the solder will adhere. An indentation deeper than $\frac{1}{16}$ of an inch is never repaired in this manner. It is always first bumped or straightened so that only slight unevenness results.

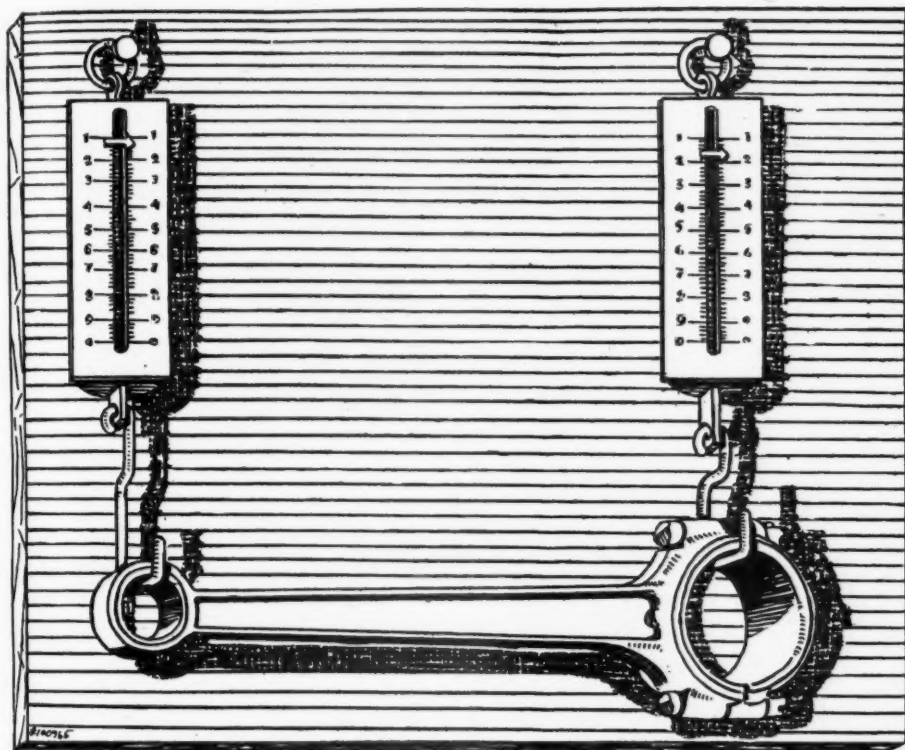


Many maintenance men say that the tractor, truck and passenger car specification published each week by MOTOR AGE are alone worth the subscription price. You will find them on pages 51 to 56 inclusive.



Wiring diagram of 1920 Seneca

Balancing Rotating and Reciprocating Weight of Connecting Rods



Q—I have a Continental 7W engine and wish to lighten the connecting rods by drilling them to make them lighter in weight. Just how will I get the rods balanced right at both ends

In the January 18, 1923, issue of Motor Age you spoke about balancing connecting rods on a knife edge on one end and using a spring balance on the other. Explain exactly how this is done. I wish to weigh the upper or reciprocating end separate from the lower end and, of course, also wish to have the rotating portion balanced.—North Dakota Reader.

1—The illustration given shows a method of using two spring balances for checking the weight of connecting rods. It is, of course, possible to use only one

spring balance and support one end on a knife blade in order to weigh the other. The method with two spring balances, however, would be a little easier and somewhat more accurate. The rods should be checked up so that the large ends are the same within one-quarter ounce and the upper ends should also weigh the same within one-quarter ounce. It would also be well if the total weight of the rods did not vary more than $\frac{1}{4}$ ounce. Material should not be removed by drilling but may be removed by filing or milling the web and also the outer portion only to the extent of smoothing up the surface.

bearings are removed, it is advisable to measure from the end of the axle housing to the end of the axle shaft on each side and see that each shaft protrudes an equal amount from the housing.

Main Bearing Adjustment

4—How is the best way to take up on main bearings without pulling engine? Cross member of frame is directly under rear main cap.

4—Although somewhat unhandy to get at, the rear bearing cap may be removed by removing the rear engine support block which rests on the cross member. In case you are unable to work with this block removed, which will necessitate jacking up the rear of the engine, we would advise that you pull the engine from the chassis.

5—What mechanical changes have been made on this car since put on the market?

5—A detailed list of these changes would require considerable space in these columns and we would advise that you compare the 1923 four-cylinder catalog with a catalog pertaining to the year of manufacture of your model. One of the changes that we know of is the substitution of fabric joints for the metallic joints originally used behind the clutch.

6—How can we stop clutch collar and universal from throwing grease?

6—The clutch collar should not be packed with grease, but should be lubricated with engine oil. The amount of oil put in should be sufficient to just fill the collar housing. If oil is used, the bearing or clutch throwout will not leak. It is possible that you are using too much grease in the universal, and owing to centrifugal force, some of this grease must be forced out. Although grease is the proper lubricant for the universal joints in question, it is advisable to only half fill the housing instead of completely filling it, as you probably have done.

7—What is the correct adjustment on the clutch? These questions pertain to a Durant A22 four-cylinder car No. M. T. 571, engine No. 5607.—Durant, Cincinnati, Ohio.

7—The Durant clutch is adjusted in much the same manner as the Ford clutch. If the clutch slips or grabs, the spring tension on the pressure ring should be either taken up or released by pulling cotter pins that lock the adjusting nuts and pressure ring bolts and turning nut to the right for a slipping clutch and to the left for a grabbing clutch. These nuts should be given only a quarter turn at a time until the correct adjustment is secured.

FITTING NEW PISTONS TO CYLINDERS

Q—We are just starting in business and have no cylinder micrometer; give some idea of how much oversize replacement pistons should be for the different piston clearances. Is .005 of an inch sufficient clearance between the ends of a 3 in. piston ring?—C. D. Kauffman, Bellaire, Mich.

Very extensive information concerning your questions will be found in May 18th and May 25th, 1922, issues of Motor Age, copy of which is being sent you.

DIFFERENTIAL ADJUSTMENT ON DURANT

Q—How do you get the correct adjustment on ring gear and pinion on the Durant 4? The outer ends of the shafts are carried on tapered roller bearings which fit tapered ends of shafts with adjustment for end play. Is the thrust of differential carried on these bearings?

The adjustment of the ring gear and pinion on the Durant rear axle is accomplished in exactly the same manner as on any of the conventional type of three-quarter or full-floating axles. The bearings at the outer end of the axle housing have nothing whatsoever to do with the adjustment of the differential and are used to carry the axle driveshaft and retain the driveshaft in the differential and axle housing. No thrust of the differential carrier is taken by these bearings, as the inside or inner end of the shafts have a splined end which is free to move in the differential carrier.

2—End play shows up every 2000 or 3000 miles on right side. If we continue to take up on right side won't that change ring gear and pinion adjustment?

2—If the left side bearings have not worn or loosened, you will not change the adjustment by adjusting the right-hand bearings. The differential carrier should not require adjustments as frequently as you have made them and we would advise that you thoroughly inspect both bearings of the carrier and see that locking devices are in working order and that the bearings themselves are not worn. Also, be sure that when you make an adjustment that the right-hand bearing is brought up against the carrier, because in many cases where the gears are meshed very deeply the ring gear may be bearing against the pinion instead of against the right-hand bearing.

3—Suppose both outer bearings were removed and put back how would you know where you were at on ring gear and pinion adjustment?

3—The outer bearings have nothing to do with the ring gear and pinion adjustment, and are used to carry the axle shaft and to maintain the axle shaft in the differential carrier. If the outer

BOOSTING ACCESSORY SALES

DO you still have the names of the people who bought cars from you last year? Have you sold them a tire lately, or a bumper, or a tire lock? Have you sold them any accessories?

Accessory buyers are money-makers and if you are passing them up; then you can be sure that they will also pass you up and go to the next man along the line.

Improvements in tread, bead and sidewall construction are the chief features of interest in the new Goodyear beveled-edge All-Weather Tread cord tire.

The beveled edge cord tire is double molded, insuring better pressure and more uniform cure in manufacturing. A slight change in the tread appearance is the most interesting point about the new tire. The familiar All-Weather Tread with its diamond blocks has not been changed noticeably, but there is a slight bevel on the outside edges of the tread so that it and the sidewall meet in a more gradual union.

In addition, the tread on the beveled-edge tire is semi-flat, giving greater contact with the road and, as a result, improved traction. At the same time, this construction also relieves the strain on the shoulders of the tire because of a reduction in vibration. Goodyear Tire & Rubber Co., Akron, O.

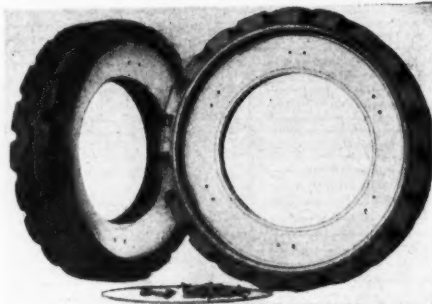
The Ideal Equipment Co., Indianapolis is marketing a new hood lock, a cut of which is reproduced on this page. As shown in the picture, the lock is equipped with two large rubber bumpers that come in contact with the hood, eliminating rattles. It is also equipped with a lubricating pad which is forced to the top of the main body. The prices range from 75 cents to \$1.75.

On this page in the April 19 number of MOTOR AGE the Duplex Second Spare Tire Carrier and Rim Tool was described, and a cut printed. It has just come to our attention that this article was ascribed to the wrong manufacturer. That notice should have read:

The Duplex Second Spare Tire Carrier and Rim Tool, when used as a tire carrier, is attached to the spare tire carrier, from which it can easily be removed for use as a rim contractor or expander. Retail price is \$5. Tripp-Secord & Co., Kerr Building, Detroit, Mich.

The Christie Road Light is shown in the cut on this page and its many uses are at once apparent. The control for this light is attached to the steering post where the driver can turn it on or off without taking his hands from the wheel. The light is focused to the road and does not shine on a level with oncoming cars. Christie, Inc., Bridgeport, Conn., is the manufacturer.

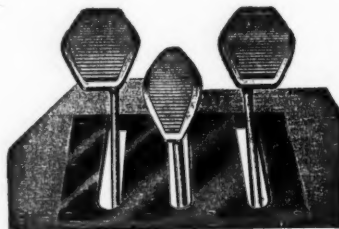
Wilcox Trux, Inc., Minneapolis, Minn., announces the Will's Solid Tire Adapter for pneumatic tire wheels. These are designed for trucks, are light in weight and, according to the manufacturers, the change from the pneumatic to the solid



Will's solid tire adapters



Lorentzen headlight control



Perfection Ford extension pads



Duplex second spare tire carrier and rim tool

tire by means of the Will's Adapter makes no difference in the gear ratio, speed and road clearance.

The Perfection Ford Extension Pads for Ford cars are shown in a cut on this page. They are manufactured by the Auto Pedal Pad Co., 318 West 52nd street, New York City. They sell at \$1.25 a set.

The Lorentzen Headlight Kontrol, Inc. 60 Grand street, New York City, has announced the Lorentzen Headlight Kontrol. The cut shows how the attachment, fitted to the steering post, brings the headlights under the driver's control without having him remove his hands from the wheel. It sells for \$7.50.



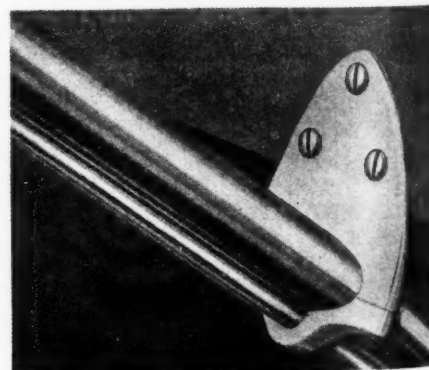
Christie road light



Ideal hood lock



New Goodyear tread

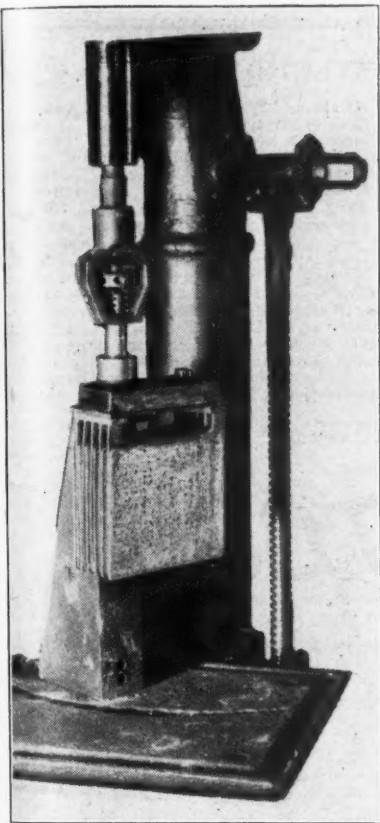


Okay steering post bracket

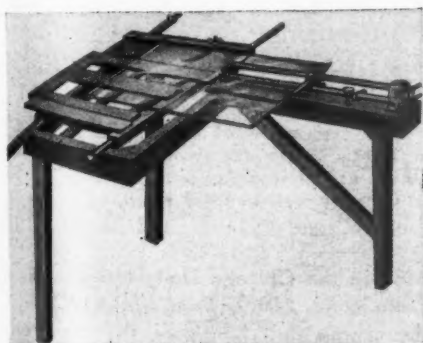
The Little Wonder Rain Pad is the name of a new accessory recently announced by Valley Sales Co., 314 Wainright Bldg., St. Louis, Mo. This pad is a felt strip, containing a chemical which, when rubbed across the windshield when raining, will keep the water running off of the glass so that vision is unobstructed.

The Okay Steering Post Bracket is manufactured by the Okay Manufacturing Co., 423 Mt. Elliot avenue, Detroit. The cut shows it attached to the steering post of a Ford car for which it is designed. It is intended to hold the post in position. It sells at \$1.50.

GETTING MORE OUT of the SHOP



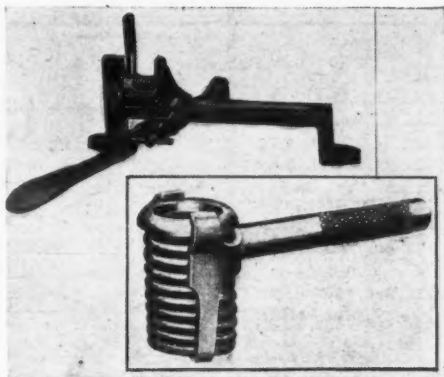
Jung post bead roller



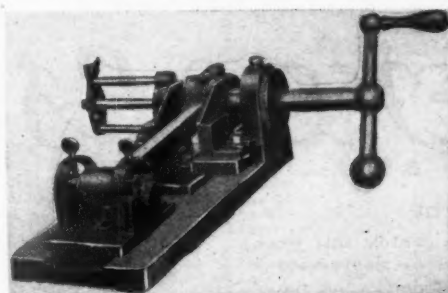
M. P. glass cutting machine

USED cars—have you ever stopped to consider just how many used car sales are the result of a well-equipped shop? Not long ago, a dealer in a small town near Chicago told a *MOTOR AGE* representative that whenever he wanted to sell a used car, he took the prospect through his shop and showed him the facilities for putting in order any car that was on his floor.

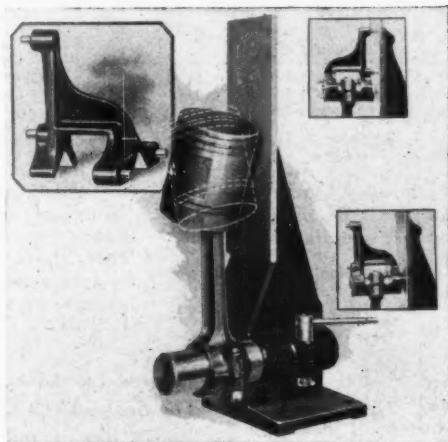
The shop he used as a means of clinching his talk and removing any doubt in the customer's mind as to whether he was equipped to make a car worth the money he asked for it. Too, the buyer of a used car wants to know what facilities the dealer is provided with to service that car. They know that they will probably have reason to call on that dealer for service a little sooner, perhaps, than the new car buyer, and whether the customer owns a 1923 or a



American Spring compressor



Wadell's bearing fitting fixture



Stevens piston aligner

1910 model, he wants to know how and where to get real service.

The dealer who has a shop equipped to do the work that will be required of him is the man who will do the most business.

Wadell's Bearing-Fitting-Fixture, shown in the cut on this page is announced by the W-A Mfg. & Sales Co., Bloomfield, N. J.

The Pep Mfg. Co., Inc., maker of the water-mixed valve grinding Pep, recently placed a new bearing grinding compound on the market. The new compound may be mixed with either oil or water. Price, 4-oz. can, \$1. Made by Pep Mfg. Co., Inc., 33 W. 42nd St., New York, N. Y.

The Kelly Supply Co., 613 Peoria Life Bldg., Peoria, Ill., announces the Kelly Super Visible Oil Dispenser.

There are two parts to the American Spring Compressor, one the spring compressor and the other the spring holder. When inserting valve spring the compressor first closes up the spring which then fits in the holder and after the valve pin is put in place the holder is released to allow the spring to expand. Extra holders are priced at 50 cents each. American Tool Co., 10 Pleasant street, Pawtucket, R. I. makes this tool for \$5.75.

The Jung post bead roller for use on Prest-O-Lite batteries rolls the sealing band on six posts in four minutes, according to the Battery Service Station, 567 Pine street, Burlington, Wis. This tool is machined of a high grade steel and is priced at \$12.75, including post builder.

Stevens Piston Aligner is made by Stevens & Co., 375 Broadway, New York. The "Sea Lion" indicator is shown in the cut with the aligner. The indicator detects twists and bends in the connecting rod before the piston is assembled. The two smaller inserts on the right of the cut show at the top, the indicator checking the rod for bend and at the bottom checking for twist. The center figure shows the assembled piston tilted against the broad machined surface for final check.

The Manley Hi-Speed Jack is announced by the Manley Mfg. Co., York, Pa., and is intended for general use in the shop. It has six distinct operating positions of the handle for raising and lowering cars, it is made of malleable iron and steel.

F. C. Phillips, Stoughton, Mass., has placed on the market the M. P. Glass Cutting Machine. The picture printed on this page shows the cutter with table. The uses of this piece of equipment are at once apparent.

The Eagle Junior Aligning Fixture was designed to fit the requirements of repair shops and garages specializing on small cars. The new model is not a universal fixture, but will handle aligning work unusually fast on Fords, Chevrolets and Overland cars. It will check the wrist pin and connecting rod for either twist or bend in the rod.

The main casting is heat treated and hand scraped to micrometer accuracy. The adjustable square is ground to perfect accuracy. The vice clamp operates in any vise. Eagle Junior Aligning Fixture, net price \$18.75; height over all, 13 in. Bench space, 6x6 in.—Eagle Machine Co., 24 N. Noble St., Indianapolis, Ind.

To the line of Fulflo Self Priming Pumps, made by Fulflo Specialties Co., Blanchester, Ohio, has been added the 75-gal. capacity, ball bearing, motor driven pump shown in the cut. The demand for unit systems for pumping liquids, coolant compounds, oils, brines, enamels, etc., has brought forth this latest addition to the Fulflo family.

COMING MOTOR EVENTS

AUTOMOBILE SHOWS

Red Bank, N. J.	Eighth Annual Show	May 7-12
Green Bay, Wis.	Annual Automobile Show	Aug. 27-30
Chicago	Commercial Vehicle Show	Sept. 1-7
Sacramento	Annual Automobile Show	Sept. 3-8
Memphis	Annual Automobile Show	Sept. 28-30
Fresno, Calif.	Automobile Show	Sept. 28-Oct. 5
Little Rock, Ark.	Annual Automobile Show	Oct. 8-13
Dallas, Texas	Annual Fall Show	Oct. 13-18
Washington, D. C.	Annual Fall Automobile Show	Oct. 28-31
Waco, Texas	Waco Automobile Dealers' Assn.	Oct. 20-Nov. 5
New York	Salon at the Hotel Astor	Nov. 4-10

RACES

Indianapolis	Annual 500 Mile International Sweepstakes	May 30
Tours, France	Grand Prix 500 Mile Race	July 2

CONVENTIONS

New York	National Highway Traffic Association, Automobile Club of America	May 10
Detroit	Spring Convention of Service Managers' Division of National Automobile Chamber of Commerce	May 15-16
Spring Lake, N. J.	Summer Meeting of the Society of Automotive Engineers	June 19-23
Chicago	National Conference of Trade Association Secretaries and Managers under the auspices of the National Automobile Dealers' Assn.	July 23-24
Dixville Notch, N. H.	Summer Meeting of the Automotive Equipment Association	June 25-July 1
Olympia, Wash.	Convention Washington Automotive Trade Association	July
Mobile, Ala.	Semi-Annual Meeting of the Alabama Automotive Trades Association	July 23
Chicago	Exhibit and Convention of Automotive Equipment Association	Nov. 12-17

SQUEEKS & RATTLES

If You Know Any, Tell Them to Us

Prize Contest Announcement

Squeeks & Rattles announces a novel prize contest this week in that we will give a handsome set of asbestos sleeves for a fancy vest to the guy who tells us what the deuce the name of that car is that they're raising the curtain on these days. Entries must be in before last Saturday. A hint as to what the car's name is will be found on pages 54 and 56.

Biblical Picture

Mother—Now, this is a ford at the Jordan.
Little Mary—That isn't a Ford, it's a camel.

Favorite Agonies

Another one of my favorite agonies is the guy who inquires the price of gas and oil, asks about accessories, uses the phone and makes everyone miserable, then kicks because we haven't someone to fill his tires from our curb air hose.

—G. Pat.

Pointed

"How much for the overcoat?"
"One hundred and fifty dollars, sir."
"Will you take a horse in exchange?"
"A horse? Why, I couldn't use a horse."
"Well, Jesse James Did."

Fable

Once there was a man who came in to trade his old car for a new one, who didn't tell us that some other dealer had offered him twice as much as the car was originally worth just because he had been the owner of it.

—W. E. P.

A Howl for Help—No. 3

That's all.

Looking 23 Years Ahead in Motor Age

From Utopia comes the report that an engine has been developed which requires no cooling system, therefore neither radiator, nor cylinder fins. This announcement while seemingly revolutionary is based on engineering facts. Old type engines used in the year 1923 employed a liquid fuel, which was chiefly converted into heat, only a small proportion of the available energy being converted into mechanical work.

Accordingly the radiator for dissipating this heat was usually larger than either the transmission or the differential, on which the slight burden of transmitting the power fell.

This discovery means that the oil companies are even now trying to find an outlet for their surplus stocks, so slight is the demand for motor fuel with this new type engine.

Dumbbells I Have Met

BARKER McSHINN

is still very weak.

He put oil on his

brakes to take

out the squeak.

—Jones

Your work is your brain's gymnasium.

Advertising

The hen, we are told, enjoys a higher standing than the duck because she advertises her value to the community more. Likewise, she keeps on scratching, regardless of how much corn there is in sight. Here are two lessons which, now that we are struggling upward to prosperity again, we may well keep in mind.—BARRON COLLIER.

A used car ad appearing in the Chicago Daily News, reads:
For Sale—1919 Ford; exc. cond. \$100. Rear end, \$12.

Looks like it might be a way out. Suppose the used car prospect hasn't enough to buy a whole car at once? Sell him the rear end and let him save for the rest of it.

Or,

Having decided that this used car "problem" has gone just about far enough, Squeeks & Rattles proposes this week to show up the guys who have hung onto this number 13 scare all these years. Edward S. Jordan and the Cole company are publishing stories and ads to the effect that they have solved the "problem" but our readers know and from past experience can depend on us when we say that we are offering the only real way out of this difficulty.

As usual, Squeeks & Rattles fans are given the benefit of a hard fifteen minutes' thinking on our part. (Some folks will up and tell us that we couldn't think for fifteen minutes straight without getting a headache, but they are the ones who know us better than you do.) Anyway, Jordan and Cole and everyone else will agree with us when we say that the dude who breezes into you with a car that was a beauty, '23 Years Ago', is the guy who ought to be told by you how much the car is worth—not he tell you how much you are going to give him for it.

If you follow our advice, you can't go wrong.

(Telegrams and the like, intended to thank Squeeks & Rattles for this bit of advice are not wanted but if you insist, mail us the cost.

Current Motor Truck Specifications

(This list comprises trucks distributed on a national basis)

MAKE AND MODEL	Tons Capacity	Price	ENGINE		Clutch Make	Gearset Make	REAR AXLE		TIRES	
			Make & Model	Bore & Stroke			Make & Model	Final Drive	Front	Rear
Ace.....30	1 1/2	\$2550	Mi-412	3 1/2x5	B-L	B-L	Ti-6560	WO	34x3 1/2	34x5 1/2
Ace.....40	2 1/2	3100†	Mi-402	4 1/2x5 1/2	B-L	B-L	Ti-6480	WO	36x4 1/2	36x7 1/2
Ace.....60	3	3700†	Mi-402	4 1/2x5 1/2	B-L	B-L	Ti-6560	WO	36x4 1/2	36x8
Acme.....20	1 1/2		Co-N	3 1/2x5	B&B	Cot	Ti-6250	WO	35x5 1/2	35x5 1/2
Acme.....30	1 1/2		Co-N	3 1/2x5	B&B	Cot	Ti-6352	WO	34x3 1/2	34x5
Acme.....40	2 1/2		Co-JA	3 1/2x5	B&B	Cot	Ti-6460	WO	34x3 1/2	34x5
Acme.....60	3		Co-K4	4 1/2x5 1/2	B&B	Cot	Ti-6460	WO	36x4 1/2	36x7
Acme.....90	3 1/2		Co-LA	4 1/2x5 1/2	B&B	Cot	Ti-6660	WO	36x5	40x10
Acme.....125	5 1/2		Co-B5	4 1/2x6	B&B	Cot	Ti-6760	WO	36x6	40x12
Amer. La France	3 1/2	4950	Own	4 1/2x6	Own	Own	Own	Own	36x5	36x5
Amer. La France	5	5500	Own	4 1/2x6	Own	Own	Own	Own	36x6	40x6
Armstrong.....20	1 1/2		Bu-CTU	3 1/2x5 1/2	Ful	Ful	Ti-6460	WO	34x3 1/2	34x5 1/2
Armstrong.....22	1 1/2		Bu-HTU	4 1/2x5 1/2	B-L	B-L	Ti-6560	WO	36x4 1/2	36x7 1/2
Armstrong.....24	1 1/2		Co-C4	4 1/2x5 1/2	B-L	B-L	Ti-6560	WO	36x4 1/2	36x7 1/2
Armstrong.....26	1 1/2		Bu-YTU	4 1/2x6	B-L	B-L	Ti-6666	WO	36x5 1/2	36x5 1/2
Armstrong.....28	1 1/2		Co-E4	4 1/2x5 1/2	B-L	B-L	Ti-6666	WO	36x5 1/2	36x5 1/2
Atlas.....22	1	1495	Bu	3 1/2x5 1/2	M&E	Own	Own	Own	34x4 1/2	34x4 1/2
Atlas.....24	1 1/2	1950	Own	3 1/2x5 1/2	M&E	Own	Own	Own	36x6	36x6
Atlas.....26	1 1/2	2475	Co-JA	3 1/2x5	Ful	Ful	Ti-6460	WO	34x4 1/2	34x6
Atlas.....28	1 1/2		Co-K4	4 1/2x5 1/2	B-L	B-L	Ti-6560	WO	36x4 1/2	36x6
Atlas.....30	1 1/2		Co-LA	4 1/2x5 1/2	B-L	B-L	Ti-6660	WO	36x5	40x6
Atlas.....32	1 1/2		Co-B2	4 1/2x5 1/2	B-L	B-L	Ti-6760	WO	36x6	40x7
Autocar.....21	1 1/2	2200†	Own	4 1/2x5 1/2	Own	Own	Own	Own	34x4 1/2	34x6
Autocar.....22	1 1/2	3100†	Own	4 1/2x5 1/2	Own	Own	Own	Own	34x5	36x8
Autocar.....24	1 1/2	4200†	Own	4 1/2x5 1/2	Own	Own	Own	Own	34x6	36x12
Available.....26	1 1/2	2450	He-O	4 1/2x5	B-L	B-L	Ti-6460	WO	36x3 1/2	36x5
Available.....28	1 1/2	3160	He-CU3	4 1/2x5 1/2	B-L	B-L	Ti-6560	WO	36x4 1/2	36x8
Available.....30	1 1/2	4175	He-MU3	4 1/2x5 1/2	B-L	B-L	Ti-6666	WO	36x5	40x6
Available.....32	1 1/2	5375	He-T3	5x6	B-L	B-L	Ti-6760	WO	36x6	40x12
Avry.....1	1 1/4		Own	3 1/2x4	Own	Own	To-0X2	IG	34x5 1/2	34x5 1/2
Bessemer.....G1			Co-N	3 1/2x5	Ful	Ful	To-A	IG	35x5 1/2	35x5 1/2
Bessemer.....G2		1995	Co-N	3 1/2x5	B&B	Bak	LM-7150	DR	36x3 1/2	36x5
Bessemer.....G3		2895	Co-C2	3 1/2x5	B&B	Bak	LM-7250	DR	36x4 1/2	36x6
Bessemer.....K2		3495	Co-E7	4 1/2x5 1/2	B&B	Bak	To-E	IG	36x5	36x10
Bethlehem.....KN1		1385	Own	3 1/2x5	B&B	Det	Ea-3070	SB	35x5 1/2	35x5 1/2
Bethlehem.....GN2		2185	Own	3 1/2x5	B&B	Det	Wi-60A	DR	34x4 1/2	34x6
Bethlehem.....HN3		2985	Own	4 1/2x5 1/2	Ful	Ful	Wi-88E	DR	36x4 1/2	36x6
Brockway.....E21			Wi-SU	4 1/2x5	B-L	B-L	Co-5200	SB	33x5 1/2	33x5 1/2
Brockway.....E1			Wi-SU	4 1/2x5	B-L	B-L	Ti-6460	WO	36x4 1/2	36x6
Brockway.....K2			Co-K4	4 1/2x5 1/2	B-L	B-L	Ti-6560	WO	36x4 1/2	36x8
Brockway.....K3			Co-LA	4 1/2x5 1/2	B-L	B-L	Ti-6666	WO	36x5	36x12
Brockway.....T5			Co-B5	4 1/2x5 1/2	B-L	B-L	Ti-6760	WO	36x6	40x7
Buick.....23-4-SD	3 1/2	945	Own	3 1/2x4 1/2	Own	Own	Own	Own	31x4 1/2	31x4 1/2
Case.....TR2			Own	4 1/2x5 1/2	TD	Own	To-C139	IG	36x6 1/2	36x7 1/2
Chevrolet.....T1		650	Own	3 1/2x4 1/2	Own	Mun	Own	Own	31x4 1/2	34x4 1/2
Clydesdale.....10		1485	Co-N	3 1/2x5	B&B	Bak	Ti-551L	SB	34x5 1/2	34x5 1/2
Clydesdale.....8		3650	Co-K4	4 1/2x5 1/2	B-L	B-L	Ti-6560	WO	36x5	36x5 1/2
Clydesdale.....6		4300†	Co-B5	4 1/2x5 1/2	B-L	B-L	Ti-6660	WO	36x6	40x6
Clydesdale.....4		4750†	Co-B5	4 1/2x5 1/2	B-L	B-L	Ti-6760	WO	36x7	40x7 1/2
Commerce.....14	1 1/2		Co-N	3 1/2x5	Det	Det	Se-D16	SB	32x4 1/2	32x4 1/2
Commerce.....25	2 1/2		Co-JA	3 1/2x5	B-L	B-L	Ti-6460	WO	36x3 1/2	36x5 1/2
Commerce.....34	3 1/2		Co-K4	4 1/2x5 1/2	B-L	B-L	Ti-6560	WO	36x4 1/2	36x7 1/2
Corbett.....E1		1250	HS-700	3 1/2x5	B-L	B-L	Sh-100	WO	34x4 1/2	34x4 1/2
Corbett.....E2		1480	Co-N	3 1/2x5	B-L	B-L	Sh-100	WO	34x3 1/2	34x4 1/2
Corbett.....C1		2170	Co-JA	3 1/2x5	B-L	B-L	Sh-150	WO	34x3 1/2	34x5 1/2
Corbett.....C2		2585	Co-K4	4 1/2x5 1/2	B-L	B-L	Sh-103	WO	36x3 1/2	36x7 1/2
Corbett.....B2 1/2		2970	Co-K4	4 1/2x5 1/2	B-L	B-L	Sh-21	WO	36x4 1/2	36x8
Day-Elder.....AN1 1/2			Bu-WTU	3 1/2x5 1/2	B-L	B-L	Ti-6352	WO	34x3 1/2	34x4
Day-Elder.....BN2 1/2			Co-JA	3 1/2x5	B-L	B-L	Ti-6460	WO	34x3 1/2	34x4
Day-Elder.....DN2 1/2			Co-K4	4 1/2x5 1/2	B-L	B-L	Ti-6560	WO	36x4 1/2	36x7
Day-Elder.....CN3			Bu-HTU	4 1/2x5 1/2	B-L	B-L	Ti-6560	WO	36x4 1/2	36x8
Day-Elder.....FN4			Co-LA	4 1/2x5 1/2	B-L	B-L	Ti-6666	WO	36x5	36x12
Day-Elder.....EN5-6			Bu-YTU	4 1/2x6	B-L	B-L	Ti-6760	WO	36x6	40x12
Dearborn.....E1		1600†	Bu-Mu	3 1/2x5 1/2	Ful	Ful	Wi	WO	35x5 1/2	35x5 1/2
Dearborn.....F1 1/2		1980†	Bu-WU	3 1/2x5 1/2	Ful	Ful	Wi	WO	34x4 1/2	34x5
Dearborn.....482		2390	Bu-WU	3 1/2x5 1/2	Ful	Ful	Wi	WO	34x4 1/2	34x7
Defiance.....G1		1525	Co-N	3 1/2x5	B&B	G-L	Ea-1000	SB	35x5 1/2	35x5 1/2
Denby.....31 1/2-1 1/4		1485	Co-N	3 1/2x5	Ful	Ful	Cl-B300	SB	34x5 1/2	34x5 1/2
Denby.....33 1/2		2375	Co-JA	3 1/2x5	Ful	Ful	Cl-1D	IG	35x5 1/2	35x7 1/2
Denby.....35 1/2		2975	Co-JA	3 1/2x5	Ful	Ful	Cl-2D	IG	36x4 1/2	36x7
Denby.....27 1/4		3695	Co-K4	4 1/2x5 1/2	Ful	Ful	Cl-3D	IG	36x5	36x5 1/2
Dependable.....2105		4295	Co-LA	4 1/2x5 1/2	Ful	Ful	Cl-3D	IG	36x6	40x6 1/2
Dependable.....CL1 1/2-2		2350	Bu-CTU	3 1/2x5 1/2	Ful	Ful	Wi-800J	WO	34x3 1/2	34x5
Dependable.....EG2 1/2-3		2950	Bu-ETU	4 1/2x5 1/2	Ful	Ful	Wi-900C	WO	36x5	36x10
Diamond T.....O31-1 1/4		1975	Hi-700	3 1/2x5 1/2	Cov	Cov	Own	Own	36x3 1/2	36x4
Diamond T.....T1 1/2		2250	Hi-700	3 1/2x5 1/2	Cov	Cov	Ti-6460	WO	36x3 1/2	36x5
Diamond T.....U2 1/2		2650	Hi-1400	4 1/2x5 1/2	Cov	Cov	Ti-6560	WO	36x4 1/2	36x8
Diamond T.....K3 1/2		3750	Hi-1500	4 1/2x5 1/2	Cov	Cov	Ti-6666	WO	36x5	36x12
Diamond T.....EL5		4325	Hi-200	4 1/2x5 1/2	Cov	Cov	Ti-6760	WO	36x6	40x6 1/2
Diamond T.....S5		4500	Co-B5	4 1/2x6	B-L	B-L	Ti-6760	WO	36x6	40x6 1/2
Dodge Brothers.....3 1/2		750	Own	3 1/2x4 1/2	Own	Own	Own	Own	32x4 1/2	32x4 1/2
Dura.....K-4 1/2		3400	Own	4 1/2x5 1/2	Own	War	Ti-6560	WO	36x4 1/2	36x7
Dura.....K-7 1/2		4400	Own	4 1/2x5 1/2	Own	War	Ti-6660	WO	36x7	36x10
Dur.....109 1/2		685b	Ly-K	4 1/2x5	Del	Own	Fl-105	SB	31x4 1/2	31x4 1/2
Duplex.....DF13		4000	Bu-ETU	3 1/2x5 1/2	B&B	Own	Own	Own	36x6	36x6
Duplex.....G1			Bu-WTU	3 1/2x5 1/2	B-L	B-L	Ti-551L	SB	33x5	33x5 1/2
Duplex.....GH1 1/2			Bu-WTU	3 1/2x5 1/2	Cov	Cov	Sh-1501	WO	35x5	36x6
Duplex.....A2		2775	Hi-400	4 1/2x5 1/2	Cov	Cov	Sh-103	WO	35x5 1/2	36x7 1/2
Duplex.....AC2 1/2-3			Hi-400	4 1/2x5 1/2	B-L	B-L	Vu-4	WO	34x5	36x8

* Make Optional
 † Short wheelbase model
 ‡ 6 cylinders
 † All 4 cyl. engines unless otherwise specified
 †† Truck Tractor
 ††† Front wheel drive
 ††† price includes body or cab
 ††† dual
 ††† pneumatic tires optional at extra cost
 ††† pneumatic tires standard

ENGINE:
 Bu-Buda
 Co-Continental
 Do-Dodge
 He-Hercules
 Hi-Hinkley
 HS-Herschell-Spillerman
 Ly-Lycoming
 Mi-Midwest
 Wa-Waukesha
 We-Weideley
 Wi-Wisconsin

CLUTCH & GEARSET
 B&B-Borg & Beck
 B-L-Brown-Lipe
 Bak-Baker
 Cam-Campbell
 Cot-Cotta
 Cov-Covert
 Del-Detlaft
 Det-Detroit
 Ful-Fuller
 H-S-Hele-Shaw
 Hoo-Hoosier
 M&E-Merchant & Evans

Mec-Mechanics
Mun-Muncie
T.D.-Twin Disc
War-Warner
REAR AXLE:
 Am-American
 Cl-Clark
 Co-Columbia
 Du-Durston
 Ea-Eaton
 Fl-Flint
 LM-L-M

Ru-Russel
Sal-Salisbury
Sh-Sheldon
Ti-Timken
To-Torbenen
Wa-Walker
Wi-Wisconsin
Ch-Chain
DR-Double Reduction
IG-Internal Gear
SH-Spiral Bevel
SP-Straight Bevel
WO-Worm

Current Motor Truck Specifications—Continued

(This list comprises trucks distributed on a national basis)

MAKE AND MODEL	Tons Capacity	Price	ENGINE		Clutch Make	Gearset Make	REAR AXLE		TIRES	
			Make & Model	Bore & Stroke			Make & Model	Final Drive	Front	Rear
Larrabee...X2	1-1 1/2	\$1865	Co-8R...	3 3/4x4 1/2	B-L	B-L	Sh-1480	SB...	34x5n	34x5n
Larrabee...J4	1 1/2-2 1/2	2400	Co-J4...	3 3/4x5	B-L	B-L	Sh-1501	WO...	34x3 1/2	34x5k
Larrabee...K5	2 1/2-3 1/2	3400	Co-L4...	4 1/2x5 1/2	B-L	B-L	Sh-22...	WO...	36x4	36x8
Larrabee...L4	3 1/2-4 1/2	4000	Co-L4...	4 1/2x5 1/2	B-L	B-L	Sh-31...	WO...	36x5	36x10
Maccar...H2	1 1/2		Co-K4...	4 1/2x5 1/2	B-L	B-L	Ti-6460	WO...	36x4	36x6
Maccar...HA2			Co-K4...	4 1/2x5 1/2	B-L	B-L	Ti-6560	WO...	36x4	36x10
Maccar...H23			Co-L4...	4 1/2x5 1/2	B-L	B-L	Ti-6660	WO...	36x4	36x10
Maccar...M31			Co-L4...	4 1/2x5 1/2	B-L	B-L	Ti-6660	WO...	36x4	36x10
Maccar...G5-6			Co-B2...	4 1/2x6	B-L	B-L	Ti-6760	WO...	36x5	36x10
MacDonald...O3-5		5500b	Bu-WTU	3 3/4x5 1/2	B-L	B-L	**Own...	IG...	36x6	36x10
MacDonald...A71		800b	Bu-YTU	4 1/2x6	B-L	B-L	**Own...	IG...	40x7	40x14
Mack...AB11		3000	Own...	4x5	Own	Own	Own...	DR...	36x3 1/2	36x3 1/2
Mack...AB11		3450	Own...	4x5	Own	Own	Own...	DR...	36x3 1/2	36x3 1/2
Mack...AB2		3300	Own...	4 1/2x5	Own	Own	Own...	DR...	36x4	36x4
Mack...AB2		3750	Own...	4 1/2x5	Own	Own	Own...	DR...	36x4	36x4
Mack...AB2 1/2		3400	Own...	4 1/2x5	Own	Own	Own...	DR...	36x4	36x4
Mack...AB2 1/2		3850	Own...	4 1/2x5	Own	Own	Own...	DR...	36x4	36x4
Mack...AC3 1/2		4950	Own...	5x6	Own	Own	Own...	Ch...	36x5	36x5
Mack...AC5		5500	Own...	5x6	Own	Own	Own...	Ch...	36x6	36x6
Mack...AC5 1/2		5750	Own...	5x6	Own	Own	Own...	Ch...	36x6	36x6
Mack...AC7 1/2		6000	Own...	5x6	Own	Own	Own...	Ch...	36x7	36x7
Mack...AC7 1/2		3400	Own...	4 1/2x5	Own	Own	Own...	Ch...	36x4	36x4
Mack...AC7 1/2		4950	Own...	5x6	Own	Own	Own...	Ch...	36x5	36x5
Mack...AC10		5500	Own...	5x6	Own	Own	Own...	Ch...	36x6	36x6
Mack...AC13		5750	Own...	5x6	Own	Own	Own...	Ch...	36x6	36x6
Mack...AC15		6000	Own...	5x6	Own	Own	Own...	Ch...	36x7	36x7
Mason...11		1200	He...	4x5	Hoo	War	FL...	SB...	34x5n	34x5n
Master...JW		2290	Bu-OU...	4 1/2x5 1/2	Ful	Ful	Ti-6460	WO...	34x4	34x5
Master...DD		3190	Bu-HU...	4 1/2x5 1/2	Ful	Ful	Wa-25A	IG...	34x4	36x8
Master...W		2790	Bu-HU...	4 1/2x5 1/2	Ful	Ful	Ti-6560	WO...	34x4	36x8
Master...A31		3990	Bu-YTU	4 1/2x6	B-L	B-L	Ti-6660	WO...	36x5	36x5
Master...B5		4990	Bu-ATU	4 1/2x6 1/2	B-L	B-L	Ti-6760	WO...	36x6	36x6
Master...F5		5090	Bu-ATU	4 1/2x6 1/2	B-L	B-L	Wa-5A	IG...	36x6	36x6
Maxwell...11		932	Own...	3 3/4x4 1/2	Own	Own	Ti...	WO...	35x5n	35x5n
Menominee...B1		1650	Wi-SU...	4x5	B&B	Det.	Co-5200	SB...	35x5n	35x5n
Menominee...HT11		2000	Wi-FAU...	3 3/4x5	Ful	Det.	Wi-800G	WO...	34x3 1/2	36x5k
Menominee...H11		2175	Wi-EAU...	4x5	Ful	Det.	Wi-800H	WO...	36x3 1/2	36x5k
Menominee...D2-2 1/2		2875	Wi-TAU...	4x6	Ful	Det.	Wi-800J	WO...	36x4	36x8
Menominee...J5		4850	Wi-RAU...	4 1/2x6	B&B	Det.	Ti-6760	WO...	36x6	36x6
Moline...10 1/4		1695	Own...	3 1/2x5	B&B	Own	To-A...	IG...	34x5n	36x6n
Moreland...R.R.1		1595	He-O...	4x5	B-L	B-L	Ti-5512	WO...	34x5n	34x5n
Moreland...BX11		1980	He-O...	4x5	B-L	B-L	Ti-6461	WO...	36x3 1/2	36x6
Moreland...EX2		2625	Co-K4...	4 1/2x5 1/2	Own	Own	Ti-6461	WO...	36x4	36x8
Moreland...AX3		3500	Co-L4...	4 1/2x5 1/2	Own	Own	Ti-6560	WO...	36x5	36x10
Moreland...R.A5		4600	Co-B5...	4 1/2x6	Own	Own	Ti-6660	WO...	36x6	36x10
Nash...2018	1-1 1/2	1595	Own...	3 3/4x5 1/2	B&B	Det.	Cl-ID...	IG...	34x4	34x5
Nash...4017F	2-2 1/2	2750	Bu-HU...	4 1/2x5 1/2	B&B	Own	IG...	IG...	36x6	36x6
Nash...3018	2-2 1/2	2150	Own...	3 3/4x5 1/2	B&B	Det.	Cl-ID...	IG...	34x4	34x5
Nash...5018	2 1/2	2250	Own...	3 3/4x5 1/2	B&B	Det.	Cl-ID...	IG...	34x4	34x5
Noble...A-21	1-1 1/2	1750	Bu-MU...	3 3/4x5 1/2	Ful	Ful	Sh-1501	WO...	34x5n	34x5n
Noble...B-31	1 1/2-2	2395	Bu-CTU...	4 1/2x5 1/2	Ful	Ful	Sh-103	WO...	36x4	36x4
Noble...D-51	2 1/2-3 1/2	2795	Bu-HTU...	4 1/2x5 1/2	Ful	Ful	Sh-21...	WO...	36x4	36x8
Noble...E-71	3 1/2-5	3495	Bu-YTU...	4 1/2x6	Ful	War	Sh-30...	WO...	36x5	36x10
Old Reliable...B2 1/2		3500	Wi-UAU...	4 1/2x6	Ful	Ful	Sh-21...	WO...	34x4	36x8
Old Reliable...C3 1/2		4250	Wi-UAU...	4 1/2x6	Ful	Ful	Sh-31...	WO...	36x5	36x12
Old Reliable...D5		5000	Wi-RAU...	4 1/2x6	Own	B-L	Sh-51...	WO...	36x6	40x12
Old Reliable...K7 1/2		6000	Wa-P...	4 1/2x6 1/2	Own	Own	Ch...	Ch...	40x14	40x14
Oldsmobile...T1		1095	Own...	3 1/2x5 1/2	B&B	War	To-OXL	IG...	35x5n	35x5n
Onda...C2 1/2		2825	Hi-400...	4x5 1/2	Ful	Ful	Wi-800J	WO...	36x3 1/2	36x7
Onda...C2 1/2		3200	Hi-400...	4x5 1/2	Ful	Ful	Wi-900C	WO...	36x4	36x7
Onda...D3 1/2		4050	Hi-200...	4 1/2x5 1/2	Ful	Ful	Ti-6652	WO...	36x5	36x10
Overland...4D		425	Own...	3 3/4x4	B&B	Own	Own...	SB...	30x3 1/2	30x3 1/2
Packard...EC2-3		3100	Own...	4 1/2x5 1/2	Own	Own	Own...	WO...	36x4	36x7
Packard...EX2		3500	Own...	4 1/2x5 1/2	Own	Own	Own...	WO...	36x6n	40x8n
Packard...ED5		4100	Own...	4 1/2x5 1/2	Own	Own	Own...	WO...	36x5	36x5d
Packard...EF5-7		4500	Own...	5x5 1/2	Own	Own	Own...	WO...	36x6	40x6d
Patriot, Revere...1		1295	Co-N...	3 3/4x5	B&B	Cov.	Du-B...	WO...	35x5n	35x5n
Patriot, Lincoln...2		2400	Hi-100...	4x5 1/2	Cov.	Ful	Ti-6560	WO...	34x4n	34x4n
Pat., Washington...3		3000	Hi-200...	4 1/2x5 1/2	Cov.	Cov.	Wi-900	WO...	36x5n	36x8n
Pierce Arrow X52		3200b	Own...	4x5 1/2	Own	Own	Own...	WO...	36x4	36x4d
Pierce Arrow W23 1/2		4350b	Own...	4 1/2x6 1/2	Own	Own	Own...	WO...	36x5	36x5d
Pierce Arrow R105		4850b	Own...	4 1/2x6 1/2	Own	Own	Own...	WO...	36x5	40x6d
Rainier...R31	3/4		Co-N...	3 3/4x5	B-L	B-L	Ti-6250	WO...	35x5n	35x5n
Rainier...R29 1/2			Co-N...	3 3/4x5	B-L	B-L	Ti-6250	WO...	34x3 1/2	34x4
Rainier...R36 1 1/2			Co-J...	3 3/4x5	B-L	B-L	Ti-6460	WO...	34x3 1/2	34x5
Rainier...R28 2-2 1/2			Co-K4...	4 1/2x5 1/2	B-L	B-L	Sh-103	WO...	34x4	34x7
Rainier...R20 2 1/2-3 1/2			Co-K4...	4 1/2x5 1/2	B-L	B-L	Ti-6560	WO...	36x4	36x8
Rainier...R25 3 1/2-5			Co-L4...	4 1/2x5 1/2	B-L	B-L	Ti-6660	WO...	36x5	36x5d
Rainier...R27 6			Co-B5...	4 1/2x6	B-L	B-L	Ti-6760	WO...	36x6	40x6d
Reo...F1 1/4		1185	Own...	4 1/2x4 1/2	Own	Own	Own...	SB...	34x4 1/2	34x4 1/2
Republic...75 3/4		1395b	Ly-KB...	3 3/4x5	Ful	Ful	To-750	IG...	33x5n	33x5n
Republic...10E1		1395	Co-N...	3 3/4x5	Ful	Ful	To-1000	IG...	34x5n	34x5n
Republic...11X 1 1/2		1795	Co-J4...	3 3/4x5	Ful	Ful	To-CT2	IG...	34x3 1/2	34x6
Republic...19W 2 1/2			Wa-FU...	4x5 1/2	Ful	Ful	To-CT2	IG...	36x4	36x7
Republic...19 2 1/2		2195	Co-K4...	4 1/2x5 1/2	Ful	Ful	To-CT2	IG...	36x4	36x7
Republic...20 3 1/2		3095	Co-L4...	4 1/2x5 1/2	Ful	Ful	To-E...	IG...	36x5	36x5d
Rowe...CW 1 1/2		3000	Wi-CAU...	3 3/4x5	B-L	B-L	Sh-1501	WO...	36x6n	36x6n
Rowe...CDW2		3300	Wi-EAU...	4x5	B-L	B-L	Sh-103	WO...	36x5	36x5d
Rowe...CDW 2 1/2			Wi-NU...	4 1/2x5	B-L	B-L	Sh-21...	WO...	34x5	36x4d
Rowe...GSW3		4150	Wi-TAU...	4x6	B-L	B-L	Sh-21...	WO...	36x6	36x5d
Rowe...HW4		4500	Wi-UAU...	4 1/2x6	B-L	B-L	Sh-31...	WO...	36x7	36x6d
Rowe...FW5		4850	Wi-UAU...	4 1/2x6	B-L	B-L	Sh-51...	WO...	36x7	40x6d
Ruggles...15 3/4		795	HS...	3 1/2x5	Own	Own	Co...	SB...	32x4 1/2	32x4 1/2
Ruggles...20R 1 1/4		1295	Own...	4x5	B-L	B-L	Co-5200	SB...	34x5n	34x5n
Ruggles...40 2		1995	Own...	4x5	B-L	B-L	Wi-65...	DR...	34x5n	34x5n
Ruggles...40H 2 1/2		2195	Own...	4x5	B-L	B-L	Wi-88E	DR...	36x4	36x8
Sandow...CG&G1		\$1795	Co-N...	3 3/4x5	Ful	Ful	Sh-1501	WO...	34x3 1/2	34x5
Sandow...J2 1/2		2750	Co-C4...	4 1/2x5 1/2	B-L	B-L	Ti-6560	WO...	36x4	36x7
Sandow...M5		\$4325	Co-B5...	4 1/2x6	B-L	B-L	Ti-6760	WO...	36x6	40x12
Sanford...10	1 1/2-2 1/2	1795	Co-SR...	3 3/4x4 1/2	B&B	B-L	Sh-103	WO...	36x3 1/2	36x3 1/2
Sanford...15	2 1/2-3 1/2	2150	Co-N...	3 3/4x5	B-L	B-L	Sh-1501	WO...	36x3 1/2	36x5k
Sanford...25	3 1/2-4 1/2	3050	Co-C4...	4 1/2x5 1/2	B&B	B-L	Sh-21...			

Current Motor Truck Specifications—Continued

(This list comprises trucks distributed on a national basis)

MAKE AND MODEL	Tons Capacity	Price	ENGINE				REAR AXLE		TIRES			
			Make & Model	Bore & Stroke	Clutch Make	Gearset Make	Make & Model	Final Drive	Front	Rear	MAKE AND MODEL	Tons Capacity
Walter.....N2	3600+	Own.....4x5 1/2	B-L.	B-L.	Own.....DR.	36x4	36x8				Gotfredson.....20	1685
Walter.....S5	5100+	Own.....4x5 1/2	B-L.	War.	Own.....DR.	36x6	40x6d				Gotfredson.....40	2300
White.....15 3/4	2400	Own.....3 3/4x5 1/2	Own.	Own.	Own.....SP.	34x5n	34x5n				Gotfredson.....59	3000
White.....20 1/2	3250	Own.....3 3/4x5 1/2	Own.	Own.	Own.....DR.	36x4	36x7d				Gotfredson.....80	3975
White.....40 3 1/2	4200	Own.....4 1/2x5 1/2	Own.	Own.	Own.....DR.	36x5	40x5d				Gotfredson.....100	4800
White.....45 1/2	4500	Own.....4 1/2x5 1/2	Own.	Own.	Own.....DR.	36x6	40x6d				Mapleleaf.....114	3000
Wilcox.....AA 1	1900	Own.....3 3/4x5 1/2	B-L.	B-L.	Ru-3600	SP.	35x5				Mapleleaf.....AA 2	3600
Wilcox.....BB 1 1/2	2550	Own.....4 1/2x5	B&B.	Own.	Wa-2A.	DR.	36x6k	38x7k			Mapleleaf.....BB 3	4050
Wilcox.....CC 2 1/2	3950	Own.....4 1/2x5	B&B.	Own.	Wa-25A.	DR.	36x6k	40x8k			Mapleleaf.....CC 4	4800
Wilcox.....EE 3 1/2	4350	Own.....4 1/2x5	M&E.	Own.	Wa-5A.	DR.	36x5	36x10			Mapleleaf.....DD 5	5625
Wilson.....F 1 1/2	2270+	Co-J4.....3 3/4x5	B&B.	Det.	Ti-6532	WO.	34x5n	34x5n			National.....FA 1	2699
Wilson.....EA 2 1/2	2825+	Co-K4.....3 3/4x5	B&B.	Cot.	Ti-6460	WO.	36x3 1/2	36x5k			National.....GA 1 1/2	3699
Wilson.....G 3 1/2	3685+	Co-L4.....4 1/2x5 1/2	B&B.	Cot.	Ti-6560	WO.	36x4k	36x7k			National.....HD 2 1/2	4200
Wilson.....H 5	4520+	Co-B2.....4 1/2x6	B&B.	Cot.	Ti-6660	WO.	36x5k	36x5dk			National.....NB 3 1/2	5395
Yellow Cab.....M22	1590	Co-V4.....3 3/4x5	B-L.	B-L.	Ti-6752	SB.	33x4 1/2	33x4 1/2			National.....OA 5	2699
Yellow Cab.....M42	1640	Co-V4.....3 3/4x5	B-L.	B-L.	Ti-6352	WO.	35x5n	35x5n			National.....OB 1 1/2	3699

CANADIAN

MAKE AND MODEL	Tons Capacity	Price	Make & Model	Bore & Stroke	Clutch Make	Gearset Make	Make & Model	Final Drive	Front	Rear
Bu-WTU	3 1/2	1685	B-L.	B-L.	Ti-6250	WO.	34x5n	34x5n		
Bu-GTU	4 1/2	2300	B-L.	B-L.	Ti-6460	WO.	36x6n	38x7n		
Bu-EU	4 1/2	3000	B-L.	B-L.	Ti-6560	WO.	36x4	36x8		
Bu-YTU	4 1/2	3975	B-L.	B-L.	Ti-6666	WO.	34x5	36x12		
Bu-BTU	5 1/2	4800	B-L.	B-L.	Ti-6760	WO.	36x6	40x14		
Hi-300	3 3/4	3000	Ful.	Ful.	Sh-1501	WO.	34x5n	36x6n		
Hi-400	4 1/2	3600	Ful.	Ful.	Sh-103	WO.	36x4	36x7		
Hi-500	4 1/2	4050	Ful.	Ful.	Sh-21	WO.	36x4	36x1d		
Hi-200	4 1/2	4800	Ful.	Ful.	Sh-31	WO.	36x5	36x5d		
Hi-1600	4 1/2	5625	Ful.	Ful.	Sh-51	WO.	36x6	36x6d		
Wa-BUX	3 3/4	2699	B-L.	B-L.	Ti-6352	WO.	35x5n	35x5n		
Wa-BUX	3 3/4	3699	B-L.	B-L.	Ti-6460	WO.	34x4k	34x6k		
Wa-CU	4 1/2	4200	H-S.	B-L.	Ti-6560	WO.	36x5	36x10		
Wa-DU	4 1/2	4200	H-S.	B-L.	Ti-6666	WO.	36x6	40x12		
Wa-EU	5 1/2	4800	H-S.	B-L.	Ti-6760	WO.	36x7	40x14		
Bu-CTU	3 3/4	2699	B&B.	Cot.	Sh-1501	WO.	34x5n	34x5n		
Bu-HTU	4 1/2	3699	B&B.	Cot.	Sh-21	WO.	36x4	36x7		
Bu-HTU	4 1/2	4200	B&B.	Cot.	Sh-31	WO.	36x5	36x10		
Bu-YTU	4 1/2	5395	B&B.	Cot.	Sh-31	WO.	36x5	36x10		

Current Tractor Specifications

MAKE & MODEL	Drawbar-Pulley Rating	Recommended No. of 14 Ins. Plovs	Price	ENGINE				Belt Pulley, Dimensions Dia. & Face (Ins.)	Weight (Lbs.)	TRACTION MEMBERS		
				Make	No. of Cyls. Bore & Stroke	Recom. Fuel				Dimensions, Diameter & Face (Ins.)	Type	Final Drive
Allis-Chalmers.....6-12	1	1	\$295	LeR.	4-31x4 1/2	G.	10 x 5 1/2	2,500	48x 6	W		
Allis-Chalmers.....15-25	3	1	1185	Mid.	4-41x5 1/2	G.	12 1/2 x 6 1/2	4,700	48x12	W		
Allis-Chalmers.....20-35	4	1	1885	Own.	4-49x6 1/2	G.	13 x 7 1/2	6,150	50x12	W		
Allwork.....D 20-38	4-5	1	1695	Own.	4-5 x 7	KD.	14 x 7 1/2	6,500	48x14	W		
Allwork.....G 11-28	3	1	1195	Own.	4-49x6 1/2	KD.	11 x 7	4,800	48x12	W		
Allwork.....C 16-30	3	1	1293	Own.	4-5 x 6	KD.	13 3/4 x 7 1/2	5,200	48x12	W		
Aultman-Taylor.....15-30	3-4	1	1900	Own.	4-5 x 6 1/2	GKD.	20 x 8	7,800	70x12	W		
Aultman-Taylor.....22-45	4-6	1	3100	Own.	4-51x8	GKD.	20 x 11	12,500	70x20	W		
Aultman-Taylor.....30-60	8-10	1	4400	Own.	4-7 x 9	GKD.	24 x 11	22,500	90x24	W		
Avery.....15-35	3-4	1	1900	Own.	4-41x6	GKD.	16 x 7 1/2	4,750	50x12	W		
Avery.....20-35	4-5	1	2500	Own.	4-41x6	GKD.	16 x 7 1/2	7,500	60x16	W		
Avery.....25-50	5-6	1	3500	Own.	4-61x7	GKD.	22 x 8 1/2	12,500	69x20	W		
Avery.....45-65	8-10	1	5500	Own.	4-79x8	GKD.	26 x 10	22,000	87 1/2 x 24	W		
Avery.....Tr. Runner	3	1	1900	Own.	4-41x6	GKD.	12 x 6 1/2	5,000	x 8 1/2	W		
Avery.....Road Racer	3	1	1900	Own.	4-41x6	GKD.	12 x 6 1/2	5,000	42x 6	W		
Bates (St. Mule) H.....15-25	3	1	1185	Mid.	4-41x5 1/2	G.	12 x 8 1/2	3,600	48x10	W		
Bates (St. Mule) F.....18-25	3	1	1185	Mid.	4-41x5 1/2	G.	12 x 8 1/2	4,850	56x10	W		
Bates (St. Mule) G.....25-35	4	1	1695	Own.	4-49x6 1/2	G.	12 x 8 1/2	6,500	x10	T		
Bates (St. Mule) J.....30-40	4	1	1885	Own.	4-49x6 1/2	G.	12 x 8 1/2	8,500	54x10	T		
Best.....B 25-35	4	1	4250	Ste.	4-49x6 1/2	GKD.	12 x 9	5,500	64x12	T		
Best.....30-40	4	1	4250	Ste.	4-49x6 1/2	GKD.	12 x 9	8,100	68x11 1/2	T		
Best.....60-100	9	1	2500	Own.	4-61x7	GKD.	16 x 10	18,500	89x20	T		
Bryan.....Steam 15-30	3	1	2500	Own.	2-4 x 5	KD.	18 x 7	5,500	52x12	W		
Case.....12-20	3	1	1095	Own.	4-41x5	GKD.	14 1/4 x 6 1/2	4,230	42x12	W		
Case.....15-27	3-4	1	1350	Own.	4-41x6	GKD.	16 x 6 1/2	6,600	52x14	W		
Case.....22-40	4-5	1	2650	Own.	4-51x7	GKD.	16 1/2 x 8 1/2	10,700	56x16	W		
Case.....40-72	8-10	1	4900	Own.	4-7 x 8	GKD.	19 1/2 x 10 1/2	21,200	72x20	W		
Caterpillar.....2 Ton 15	3	1	1975	Own.	4-41x5 1/2	G.	11 1/2 x 6 1/2	4,000		T		
Caterpillar.....5 Ton 25	4	1	3975	Own.	4-49x6 1/2	G.	12 x 8 1/2	9,400		T		
Caterpillar.....10 Ton 40	6	1	6050	Own.	4-61x7	G.	14 x 10 1/2	19,500		T		
Cletrac.....F 9-16	2	1	745	Own.	4-31x4 1/2	GK.	7 x 5	1,930	42x 5 1/2	T		
Cletrac.....W 12-20	2	1	1,345	Own.	4-41x5 1/2	GK.	8 x 6	3,455	48x 8	T		
East.....F 12-22	3	1	1,345	Own.	4-41x5 1/2	GK.	8 x 6	3,455	48x12	W		
East.....H 16-30	4	1	1,345	Own.	4-41x5 1/2	GK.	12 x 8 1/2	9,100	48x12	W		
E-B.....AA 12-20	3	1	1,345	Own.	4-41x5 1/2	GK.	12 x 8 1/2	4,550	51x12	W		
E-B.....O 12-20	3	1	1,345	Own.	4-41x5 1/2	GK.	12 x 8 1/2	6,500	60x12	W		
E-B.....16-32	4	1	1,345	Own.	4-51x7	GK.	16 x 9	9,400	72x16	W		
Fageol.....19-12	2	1	1175	Lyc.	4-31x5 1/2	G.	9 1/4 x 6 1/2	2,543	42x12	W		
Fordson.....18	2	1	395	Own.	4-4 x 5	K.	13 x 7	5,800	60x10	W		
Frick.....A 12-20	2	1	1000	Erd.	4-4 x 6	GK.	13 x 7	6,730	60x12	W		
Frick.....C 15-28	3	1	1690	Ben.	4-49x6 1/2	G.	13 x 7	6,900	54x54	Dr		
Gray.....EU 22-40	4	1	2385	Wau.	4-5 x 6 1/2	K.	13 x 6 1/2	3,973	46x10	W		
Hart-Parr.....20	-20	2	845	Own.	2-51x6 1/2	K.	14 x 8 1/2	5,220	52x10	W		
Hart-Parr.....30	-30	3	1065	Own.	2-61x7	K.	14 x 8 1/2	7,500	52x18	W		
Hart-Parr (Road).....30	-30	3	1395	Own.	2-61x7	K.	14 x 8 1/2	7,500	52x18	W		
Heider.....D 9-16	2	1	745	Wau.	4-41x5 1/2	GK.	12 x 6	4,000	54x 8	W		
Heider.....C 12-20	3	1	1,345	Wau.	4-41x6 1/2	GK.	14 x 7	6,000	57x10	W		
Heider.....M 5-10	1	1	1,345	LeR.	4-31x4 1/2	GK.	8 x 5	2,800	46x 6	W		
Huber.....(Light 4) 12-25	3	1	985	Wau.	4-41x5 1/2	GK.	13 x 7	5,000	60x10	W		
Huber.....(Super 4) 15-30	3	1	1,345	Mid.	4-41x6	G.	13 x 7	6,000	60x10	W		
LaCrosse.....M 6-12	1	1	1,345	Own.	2-4 x 6	K.	13 x 7	3,000	48x 7	W		
LaCrosse.....H 12-24	3	1	1,345	Own.	2-6 x 7	K.	13 x 7	3,800	56x10	W		
Lauson.....T 15-30	4	1	1,345	Bea.	4-49x6 1/2	GKD.	16 1/2 x 8 1/2	6,200		W		
Leader.....B 12-18	2	1	1,345	Own.	2-61x7	GK.	14 x 7	4,800	50x12	W		
Leader.....N 16-32	3-4	1	1,345	Own.	2-61x7	GK.	14 x 7 1/2	5,800	52x12	W		
Leader.....GU 16-32	3-4	1	1,345	Own.	2-61x7	GK.	14 x 7 1/2	5,800	52x12	W		
Lincoln.....A 15-30	3	1	1,600	Bud.	4-41x6	GK.	12 x 7	5,000	40x14	W		
Little Giant.....B 16-22	4	1	1,600	Own.	4-41x6	GK.	10 x 7	5,200	54x14	W		
Little Giant.....A 20-35	6	1	1,600	Own.	4-51x7	GK.	13 1/2 x 9	8,700	66x20	W		
Lambard.....100	12-16	1	1,600	Own.	6-53x7	GK.		19,000	x12	W		
London.....12-25	3	1	1,600	Mid.	4-41x5 1/2	G.		48x12		W		

GARDEN TRACTORS

Aro.....F	3-6	1	\$385	Own.	1-41x5	G.....	6 x 4½	1,000	30x 4	W	
Beeman.....Jr.	1½-4	1	180	B&S.	1-21x2½	G.....	3½x2	2	190	16x 3	W
Beeman.....K	1½-4	1	265	Own.	1-31x4½	G.....	3½x4½	550	25x 3½	W	
Bolens.....	1	1	180	B&S.	1-21x2½	G.....	3 x 2	190	10x 3	W	
Centaur.....1923	2½-5	1	345	N-W.	1-41x4½	GK.....	4 x 6	700	28x 4	W	
Do-It-All.....(Jack)	2½-6	1	395	Own.	1-33x3½	G.....	3 x 3	750		W	
Do-It-All.....(Baby)	2½-6	1	495	Own.	1-41x5	K.....	2 x 2	1,200	26x 2½	W	
Do-It-All.....(Twin 12)	4-15	1	495	Own.	2-33x3½	GK.....	4 x 4	800	32x 4	W	
Kinkade.....	1½-3	1	190	Own.	1-31x3	G.....	None.	180	22x 5½	W	
M.B.M. Red	1-4½	1	250	Own.	1-33x4	G.....	3 x 3½	140	20x 3	W	
Motor Maculivator			148	Own.	1-29x3½	G.....	None.	210	19x3½	W	
N.B.....	2 6	1	375	Own.	2-29x4	G.....	5½x4½	750	32x 4	W	
Utiliter.....501	2½-4	1	295	Own.	1-31x4½	G.....	4½x3½	750	24½x 4	W	
Utiliter.....501A	2½-4	1	340	Own.	1-31x4½	G.....	4½x3½	925	24½x 4	W	

Current Passenger Car Specifications

(This list comprises cars distributed on a national basis)

PRICES						Wheel Base (Ins.)	Tire Size (Ins.)	NAME AND MODEL	ENGINE				ELECTRICAL SYSTEM		Clutch: Type and Make	Gearset Make	Universal: Type and Make	REAR AXLE		
OPEN MODELS			CLOSED MODELS						Make	No. of Cyls. Bore and Stroke	Horse Power Rating (N.A.A.C.)	Carburetor Make	Generator and Starter Make	Ignition Make				Type and Make	Type and Make	Gear Ratio
2-3 Pass.	4-5 Pass.	6-7 Pass.	Sport Models	2-3 Pass.	4-5 Pass.	6-7 Pass.														
\$1950c	\$1785	\$1850	\$1885c	\$2250	\$2485		127	33x4 1/2	American.....D-66	H-S.....	6-3 1/2x5	29.40	Strom.	G-D.....	A-K.....	a-p B&B.....	B & B.....	m Hartford.....	F Salis.....	4.50
	1650						127	33x4	American.....Steamer	Own.....	2-	None	L-N.....	L-N.....	None.....	a-p B&B.....	None.....	f Universal.....	3/2 F Salis.....	4.75
	1195				1450d		114	32x4	Anderson.....41	Cont.....	6-3 1/2x4 1/2	23.44	Zenith.	West.....	West.....	a-p B&B.....	Durston.....	f Universal.....	3/2 F Salis.....	4.75
1495	1495	1595	(1785b 1915c	1995c	1995d		122	32x4	Anderson.....Series 50	Cont.....	6-3 1/2x4 1/2	27.34	Rayfield.	Remy.....	Remy.....	a-p B&B.....	Durston.....	f Universal.....	3/4 F Salis.....	4.63
	1535				2200		132	33x4	Anderson.....Series 50	Cont.....	6-3 1/2x4 1/2	27.34	Rayfield.	Remy.....	Remy.....	a-p B&B.....	Durston.....	f Universal.....	3/4 F Salis.....	4.63
	2800	2900		3625	3750	\$3850	120	32x4	Apperson.....6	Falls.....	6-3 1/2x4 1/2	23.44	Strom.	Remy.....	Remy.....	a-p Rockford.....	Mech.....	m Thieme.....	3/2 F Timk.....	4.60
	1275	1345	1995n	1965j	2245		130	33x5	Apperson.....8-23-S	Own.....	8-3 1/2x5	33.80	Johnson.	Bijur.....	Remy.....	m-d Own.....	Own.....	m Thieme.....	3/2 F Own.....	4.25
	1095			1465			121	32x4	Auburn.....6-51	Cont.....	6-3 1/2x4 1/2	27.34	Strom.	Remy.....	Remy.....	a-p B&B.....	G-L.....	m Universal.....	3/4 F Salis.....	4.75
							114	31x4	Auburn.....6-43	Cont.....	6-3 1/2x4 1/2	23.44	Strom.	Remy.....	Remy.....	a-p B&B.....	Warner.....	m Detroit.....	3/2 F Col.....	4.60
							122	32x4 1/2	Auburn.....6-63	Weid.....	6-3 1/2x5	25.35	Strom.	Remy.....	Remy.....	a-p B&B.....	Warner.....	m Thieme.....	3/2 F Col.....	4.60
	1395		1495d	1850			118	32x4	Barley.....	Cont.....	6-3 1/2x4 1/2	23.44	Strom.	Delco.....	Delco.....	a-p B&B.....	Fuller.....	f M&E.....	3/2 F Col.....	4.58
				2250p																
805	885	725g		1175	1395		109	31x4	Buick.....1923-34-5-6-7-38	Own.....	4-3 1/2x4 1/2	18.23	Marvel.....	Delco.....	Delco.....	m-d Own.....	Own.....	m Own.....	3/4 F Own.....	4.66
				1325																
1175	1195	975g		1935	1985		118	32x4	Buick.....1923-41-4-5-47	Own.....	6-3 1/2x4 1/2	27.34	Marvel.....	Delco.....	Delco.....	m-d Own.....	Own.....	m Own.....	F Own.....	4.70
	1435	1625a 1675c		1895	2195		124	33x4 1/2	*Buick 1923 45-9-50-4-55	Own.....	6-3 1/2x4 1/2	27.34	Marvel.....	Delco.....	Delco.....	m-d Own.....	Own.....	m Own.....	F Own.....	4.10
2885	2885	2885		3675c	3950	4300\$ 3990	132	33x5	Cadillac.....61	Own.....	8-3 1/2x5 1/2	31.25	Own.....	Delco.....	Delco.....	m-d Own.....	Own.....	m Spicer.....	F Tim.....	Opt.
				3753																
1750	1790		2230d	2480	2575		122	32x4 1/2	Case.....X	Cont.....	6-3 1/2x4 1/2	27.34	Rayfield.	Delco.....	Delco.....	m-d Own.....	Own.....	f Sneed.....	3/2 F Col.....	4.66
		1993	1950e	2480	2975		129	34x4 1/2	Case.....W	Cont.....	6-3 1/2x5 1/2	31.54	Rayfield.	Delco.....	Delco.....	m-d Own.....	Own.....	f Arvac.....	3/4 F Col.....	4.45
1185	1185		1445c	1595	1535		117	32x4	Chalmers.....1923	Own.....	6-3 1/2x4 1/2	25.35	Strom.	A-L.....	Remy.....	m-d Own.....	Own.....	m Hardy.....	3/2 F Adams.....	5.13
	1345				2095		122	32x4	Chalmers.....1923	Own.....	6-3 1/2x4 1/2	25.35	Strom.	A-L.....	Remy.....	m-d Own.....	Own.....	m Hardy.....	3/2 F Adams.....	5.13
	1395	1545	1695c		2295		123	32x4	Chandler.....Six	Own.....	6-3 1/2x5	29.40	Strom.	Bosch.....	Bosch.....	a-p B&B.....	Own.....	f Own.....	F Own.....	4.45
	1595				2995\$															
510	525	425g		680	800		103	30x3 1/2	Chevrolet.....Superior	Own.....	4-3 1/2x4	21.76	Zenith.	Remy.....	Remy.....	e Own.....	Own.....	m Own.....	3/2 F Own.....	3.77
					850															
710	725	625g		880	1060		103	30x3 1/2	Chevrolet.....M	Own.....	4-3 1/2x3 1/2	19.60	Carter.....	Remy.....	Remy.....	m-d Own.....	Own.....	m Mech.....	3/2 F Own.....	4.41
				1050																
1085	995		1095d	1295d	1395p		112 1/2	31x4	Cleveland.....42	Own.....	6-3 1/2x4 1/2	22.50	Strom.	Bosch.....	Bosch.....	a-p B&B.....	Own.....	m Mech.....	3/2 F Own.....	4.90
			1260d	1495d	1595p															
1885	1885	1885c		2585	2885	2685	127 1/4	33x5	Cole.....890	Nort.....	8-3 1/2x4 1/2	39.20	Johnson.	Delco.....	Delco.....	m-d North.....	North.....	m Spicer.....	F Col.....	4.70
	1475			1925c	1995		115	32x4	Columbia.....Big Six	Cont.....	6-3 1/2x4 1/2	27.34	Strom.	A-L.....	A-K.....	a-p B&B.....	Durston.....	m Spicer.....	3/4 F Tim.....	4.75
985c	1135		1395d	1295	1465		115	31x4	Columbia.....Light Six	Cont.....	6-3 1/2x4 1/2	23.44	Strom.	A-L.....	A-L.....	a-p B&B.....	Durston.....	m Spicer.....	3/2 F Tim.....	5.10
	1085			1685																
1195	1235		1495b 1565c	1875j	2055		116	32x4	Courier.....	Falls.....	6-3 1/2x4 1/2	23.44	Strom.	West.....	A-K.....	a-p B&B.....	Muncie.....	f Flexite.....	3/4 F Col.....	5.00
				2055																
	3100	3100		4500		4500	138	33x4 1/2	Crawford.....23-6-70	Cont.....	6-3 1/2x5 1/2	31.54	Zenith.	West.....	Bosch.....	m-d B-L.....	B-L.....	m Spicer.....	3/4 F Tim.....	
			3500c	4500			138	33x5	Crawford-Dagmar.....6-70	Cont.....	6-3 1/2x5 1/2	31.54	Zenith.	West.....	Bosch.....	m-d B-L.....	B-L.....	m Spicer.....	3/4 F Tim.....	
	5800	6300		7650			142	33x5	Cunningham.....V4	Own.....	8-3 1/2x5	45.00	Strom.	Delco.....	Delco.....	m-d Own.....	Own.....	f Sneed.....	F Tim.....	4.23
4350	4350c	4350	4350c	5300	5350	6000 6900c	132	33x5	Daniels.....23-38	Own.....	8-3 1/2x5 1/2	39.20	Strom.	Delco.....	Delco.....	m-d Own.....	Own.....	m Spicer.....	F Tim.....	4.23
				6250j	6900															
1495	1295		1495c	1535	1795		115	31x4	Davis.....71	Cont.....	6-3 1/2x4 1/2	23.44	Strom.	Delco.....	Delco.....	a-p B&B.....	Warner.....	m M&E.....	3/2 F Tim.....	5.10
1595	1595		1095d	2095		120	32x4 1/2	Davis.....63	Cont.....	6-3 1/2x4 1/2	27.34	Strom.	Delco.....	Delco.....	a-p B&B.....	Warner.....	m Peters.....	3/2 F Tim.....	5.15	
850	880			980	1440		114	32x4	Dodge Brothers.....	Own.....	4-3 1/2x4 1/2	24.03	Stewart.....	N.E.....	N.E.....	m-d Own.....	Own.....	m Own.....	3/2 F Own.....	4.10
				1195																
870	3950	3950	4150c	4985c	6800	4310	32 3/8	33x5	Dorris.....6-80	Own.....	6-4 x5	38.40	Strom.	West.....	Bosch.....	m-d Own.....	Warner.....	m Spicer.....	3/2 F Tim.....	1.23
	885		995c	1240	1350	108	31x4	Dort.....23-18	Lye.....	4-3 1/2x5	19.60	Carter.....	Bosch.....	Conn.....	m-d Detlaff.....	Own.....	m Mech.....	3/4 F Flint.....	4.66	
				1020																
1010	1025		1135c	1355	1465		115	31x4	Dort.....25-20	Falls.....	6-3 1/2x4 1/2	23.44	Carter.....	Bosch.....	Bosch.....	m-d Detlaff.....	Own.....	m Mech.....	3/4 F Flint.....	4.66
5750	5500	5900	5750c	7250	7500	134	33x5	Duesenberg.....Straight 8	Own.....	8-2 1/2x5	26.45	Strom.	Delco.....	Delco.....	a-p Own.....	f Climax.....	3/4 F Own.....	3/4 F Adams.....	4.45	
890	890		1065d	1365	1365	109	31x4	Durant.....A-22	Cont.....	4-3 1/2x4 1/2	24.03	Till.....	A-L.....	A-L.....	a-p Own.....	Warner.....	m Spicer.....	3/2 F Adams.....	4.33	
				1465																
1600	1650		2250	2400		123 1/2	32x4 1/2	Durant.....B-22	Anst.....	6-3 1/2x4 1/2	25.35	Rayfield.	A-L.....	A-L.....	a-p Ansted.....	Warner.....	m Spicer.....	3/2 F Tim.....	5.15	
1485	1095		1395c	1595		112	32x4	Earl.....40	Own.....	4-3 1/2x5 1/2	18.91	Scoc.....	A-L.....	Conn.....	a-p B&B.....	Own.....	f Own.....	3/4 F Tim.....	4.87	
	965		1095	1425		112	31x4	Elcar.....4-40	Lye.....	4-3 1/2x5	21.03	Strom.	Delco.....	Delco.....	a-p B&B.....	Warner.....	m Peters.....	3/4 F Salis.....	4.50	
1395	1395		1595d	1975	1995	118	32x4	Elcar.....6-60	Cont.....	6-3 1/2x4 1/2	27.34	Strom.	Delco.....	Delco.....	m-d Warner.....	Warner.....	m Spicer.....	3/4 F Salis.....	4.50	
	1045			1145	1145	108 1/2	32x4	Esex.....	Own.....	4-3 1/2x5	18.23	Own.....	Bosch.....	Bosch.....	m-d Own.....	Own.....	m Spicer.....	3/2 F Own.....	4.66	
	1195		1195	1895c	1985	120	32x4 1/2	Flint.....	Cont.....	6-3 1/2x5	27.34	Strom.	A-L.....	A-L.....	a-p Own.....	Warner.....	m Spicer.....	3/2 F Adams.....	4.66	
269r	298s	235g		530	595	100	30x3 1/2	Ford.....T	Own.....	4-3 1/2x4	22.50	Own.....	Own.....	Own.....	m-d Own.....	Own.....	m Own.....	3/2 F Own.....	3.63	
				725																
3900	3900		4900	4900		132	32x4 1/2	Fox.....7F	Own.....	6-3 1/2x5	27.34	Zenith.....	West.....	Scintilla.....	m-d B-L.....	B-L.....	m Spicer.....	3/4 F Tim.....	4.90	
	1950		2750c	2250	\$3150d	115														

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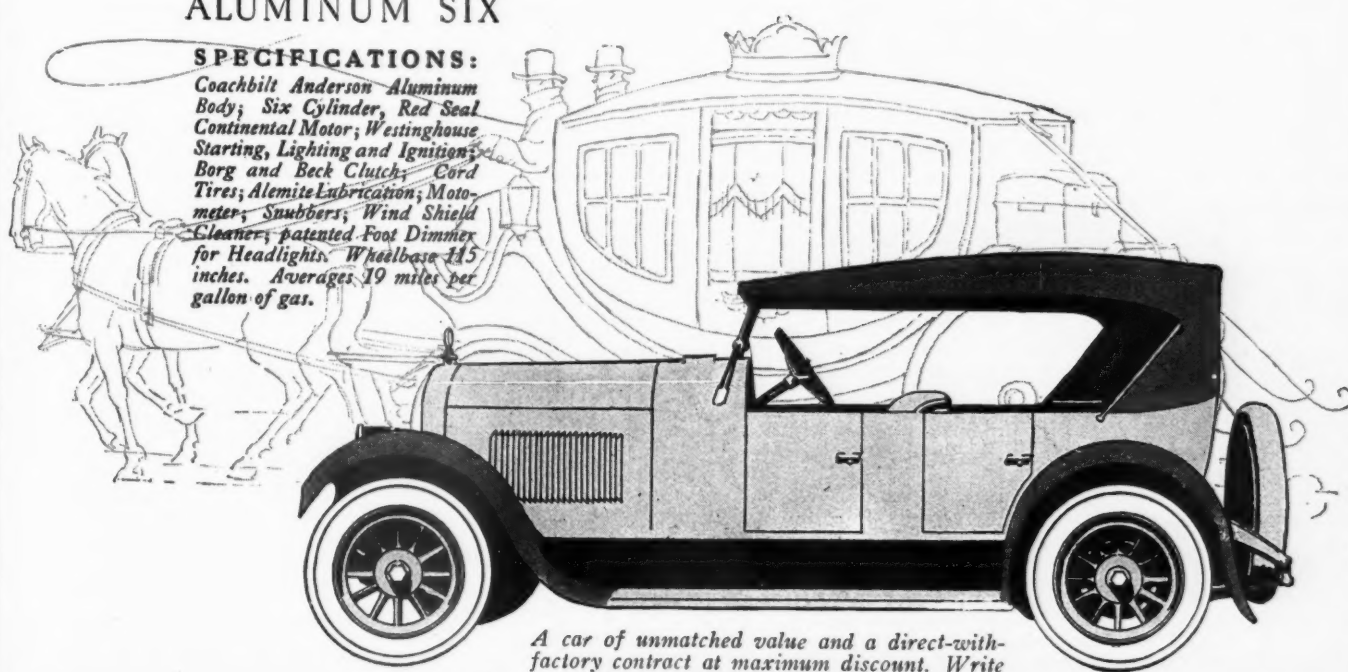
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Current Passenger Car Specifications

(This list comprises cars distributed on a national basis)

PRICES						Wheel Base (Ins.)	Tire Size (Ins.)†	NAME AND MODEL	ENGINE				ELECTRICAL SYSTEM		Clutch: Type and Make	Gearset Make	Universal: Type and Make	REAR AXLE			
OPEN MODELS			CLOSED MODELS						Make	No. of Cyls. Bore and Stroke	Horse Power Rating (N.A.A.C.)	Carburetor Make	Generator and Starter Make	Ignition Make				Type and Make	Type and Make	Gear Ratio	
2-3 Pass.	4-5 Pass.	6-7 Pass.	2-3 Pass.	4-5 Pass.	6-7 Pass.																
\$2385	\$1885	\$2385	\$2385e			3375	3075	124	32x4½	Kissel.....45	Own.	6-3½x5½	26.38	Strom.	Remy.	Remy.	m-d Warner	Warner.	m Spicer	F Own.	3.92
3985	4090	4090				2975	5500	132	33x5	LaFayette.....	Own.	8-3½x5½	33.80	Johnson.	Delco.	Delco.	m-d Own.	Own.	m Own.	F Own.	4.58
1795	1795	1795	2145d	2345	2345	2345	2345	123	32x4½	Lexington.....23	Anst.	6-3½x4½	25.35	Rayfield.	G-D.	Conn.	m-d Own.	Warner.	f Sneed.	F Salis.	5.10
1575	1395		1575	2085	2245			117	32x4	Liberty.....10-D	Own.	6-3½x5	23.44	Strom.	Wagner	Wagner	s-p B&B.	Detroit.	m Spicer	½F Tim.	4.80
3800	3800c	3800				4400	4900	136	33x5	Lincoln.....	Own.	8-3½x5	36.45	Strom.	Delco.	Delco.	m-d Own.	Own.	m Spicer	F Tim.	4.58
8600	9500c	9600				1700	5100	142	35x5	Locomobile.....Series 8	Own.	6-4½x5½	48.60	Ball&B.	West.	Delco.	m-d Own.	Own.	m Own.	F Own.	3.85
3385	3185	3185				11750	11690	136	32x4½	Marmon.....34	Own.	6-3½x5½	33.75	Strom.	Delco.	Delco.	m-d Own.	Own.	m Spicer	¾F Own.	4.10
885	885					4685	4685	109	31x4	Maxwell.....	Own.	4-35x4½	21.03	Stewart.	Remy.	Remy.	c Own.	Own.	f Own.	½F Own.	1.60
5400	4550g	5700	5000e	6720	6600e	6810	6810	140	33x5	McFarlan.....1923	Own.	6-4½x6	48.60	Rayfield.	West.	West.	m-d M&E.	B-L.	m Peters.	F Tim.	3.75
3950b		3950e	3950e	4700	4850	5000		132	32x4½	Mercer.....Series 5	Own.	4-3½x6½	22.50	Ball&B.	West.	Eisem.	m-d Own.	Own.	m Spicer	F Own.	3.87
1695	3750e	3750e	3750e					132	32x4½	Mercer.....6	Own.	6-3½x5	33.75	Strom.	West.	Eisem.	m-d Own.	Own.	m Spicer	¾F Own.	3.77
1590	1695							119	32x4	Merit.....	Cont.	6-3½x4½	27.34	Strom.	Delco.	Delco.	s-p B&B.	Muncie.	f Sneed.	F Col.	4.62
	1590		1850e	2050e	2275			120	32x4	Mitchell.....F-50	Own.	6-3½x5	29.40	Strom.	Remy.	Remy.	s-p B&B.	Own.	m Own.	F Own.	4.42
		1690						127	32x4½	Mitchell.....F-50	Own.	6-3½x5	29.40	Strom.	Remy.	Remy.	s-p B&B.	Own.	m Own.	F Own.	4.42
	1295		1495d	1585e	1605	1895p		115	31x4	Moon.....6-40	Cont.	6-3½x4½	23.44	Strom.	Delco.	Delco.	s-p B&B.	Warner.	m Spicer	½F Tim.	5.10
		1785	1995e		2585	2485		128	32x4½	Moon.....6-58	Cont.	6-3½x4½	27.34	Strom.	Delco.	Delco.	s-p B&B.	Warner.	m Spicer	½F Tim.	5.09
1240	1240		1645e		2090			121	33x4	Nash.....691-3-6-7	Own.	6-3½x5	25.35	Marvel.	Delco.	Delco.	s-p B&B.	Own.	m Own.	½F Own.	4.50
915	935	1390			1890	2190		127	31x4½	Nash.....692-4-5	Own.	6-3½x5	25.35	Marvel.	Delco.	Delco.	s-p B&B.	Own.	m Own.	½F Own.	4.50
		1195d			1445			112	33x4	Nash.....41-8	Own.	4-3½x5	18.23	Marvel.	Delco.	Delco.	s-p B&B.	Own.	m Own.	½F Own.	4.88
2475	2475e	2375	2485d		3250	3285		130	32x4½	National.....BB	Own.	6-3½x5½	29.40	Rayfield.	West.	Delco.	s-p B&B.	B-L.	m Universal	F Col.	4.08
2500	2500e	2600e			3500			128	33x5	Nema.....4C	Cont.	6-3½x4½	27.34	Zenith.	Delco.	Delco.	s-p B&B.	Detroit.	m Spicer	½F Tim.	4.45
975	995	795g	1165e	1185	1515			115	32x4	Oakland.....6-44	Own.	6-2½x4½	18.99	Marvel.	Remy.	Remy.	c Own.	Muncie.	m Mech.	F Own.	1.66
975	975		1075e	1475	1595			115	32x4	Oldsmobile.....43 A	Own.	4-3½x5½	21.86	Zenith.	Delco.	Delco.	s-p B&B.	Muncie	m Own.	¾F Own.	1.70
	1850e	1735			2635			122	33x4½	Oldsmobile.....46	Own.	8-2½x4½	26.45	Ball&B.	Delco.	Delco.	c Own.	Muncie	m Spicer	F Own.	1.53
1625p	1375		1675e	1875	2025			115	32x4	Oldsmobile.....47	Own.	8-2½x4½	26.45	Johnson.	Delco.	Delco.	s-p B&B.	Muncie	m Own.	¾F Own.	5.10
525	525		425g	795	869			100	30x3½	Overland.....91	Own.	4-3½x4	18.23	Till.	A-L.	A-L.	s-p B&B.	Own.	m Own.	¾F Own.	4.50
2485	2485	2250g	2650e	3175e	3275	3350d		126	33x4½	Packard.....126	Own.	6-3½x5	27.34	Own.	A-K.	Delco.	m-d Own.	Own.	m Spicer	½F Own.	4.66
	2350g	2085			3525			133	33x4½	Packard.....133	Own.	6-3½x5	27.34	Own.	A-K.	Delco.	m-d Own.	Own.	m Spicer	½F Own.	1.66
3850	3850	3850			5240	5100		136	35x5	Packard.....335	Own.	12-3x 5	43.20	Own.	Bijur.	Delco.	m-d Own.	Own.	m Spicer	½F Own.	4.36
2695	2450	2450			3235	3235		131	33x4½	Paige.....6-70	Cont.	6-3½x5	33.75	Rayfield.	Remy.	A-K.	m-d Long.	Warner.	m Mech.	½F Tim.	1.45
1550	1390	1425	1465d	2395d	2395			120	32x4½	Paterson.....23-6-52	Cont.	6-3½x4½	27.34	Strom.	Delco.	Delco.	s-p B&B.	Durston.	m Hartford.	½F Salis.	4.50
3300	2990	2990			3300	4090		128	33x5	Peerless.....23	Own.	8-3½x5	33.80	Ball&B.	Delco.	Delco.	m-d Own.	Own.	m Spicer	½F Tim.	4.90
5250	5250	5250			6800	6800		138	33x5	Pierce-Arrow.....	Own.	6-4 x5½	38.40	Own.	Delco.	Delco.	m-d Own.	Own.	m Spicer	½F Own.	4.29
	1695	1745	1745	2445	2495			126	32x4½	Pilot.....6-50	H-S.	6-3½x5	25.35	Till.	Bijur.	Conn.	s-p Hoosier.	Muncie.	m Hartford.	¾F Col.	1.33
3150	3100	3250	3300e	4300f	5000	5100		126½	32x4½	Premier.....6-D	Own.	6-3½x5½	27.34	Johnson.	Delco.	Delco.	s-p B&B.	Own.	m Spicer	¾F Tim.	4.58
1095	1095				1750	1825		117	32x4	Premocac.....6-40-A	Falls.	6-3½x4½	23.44	Strom.	Wagner	Wagner	s-p B&B.	Mech.	m Spicer	¾F Tim.	5.09
2485		2485	2585d	3350	3550	3675		128	32x4½	Princeton.....	Anst.	6-3½x5½	27.34	Rayfield.	A-L.	A-L.	m-d Own.	Own.	m Spicer	½F Own.	5.12
					3550			132	32x4½	Princeton.....	Anst.	6-3½x5½	27.34	Rayfield.	A-L.	A-L.	m-d Own.	Own.	m Spicer	½F Own.	5.12
	1665		2385e	2475				116	32x4	R & V Knight.....R	Own.	4-3½x5	22.50	Strom.	Wag.	Wag.	s-p B&B.	B-L.	m Spicer	F Salis.	1.75
	2850	2900	2850e		3500	3700		124	32x4½	R & V Knight.....H	Own.	6-3½x4½	29.40	Strom.	A-L.	A-L.	s-p B-L.	B-L.	m Spicer	½F Tim.	5.40
	1615	1485	1745	1855e	1885	2436d		120	32x4	Reo.....T6	Own.	6-3½x5	24.34	Rayfield.	N.E.	N.E.	m-d Own.	Own.	m Own.	½F Tim.	1.70
	1485		1885e	1985d				117	32x4	Rickenbacker.....B	Own.	6-3½x4½	23.44	Strom.	Bosch.	Bosch.	s-p Own.	Warner.	m Mechanics.	¾F Col.	4.63
2685	2485	2635	2750e	3285	3585	3585d		128	32x4½	Roamer.....6-54-E	Cont.	6-3½x5½	29.40	Strom.	West.	Split.	s-p B&B.	G-L.	f Sneed.	½F Tim.	1.60
					3950f	4000f		138	32x4½	Roamer.....6-54-E	Cont.	6-3½x5½	29.40	Strom.	West.	Split.	s-p B&B.	G-L.	f Sneed.	½F Tim.	4.60
	3485	3800	3650e		4250p	3950		128	32x4½	Roamer.....4-75-E	Rech.	4-4½x6	28.90	Strom.	West.	Split.	m-d B-L.	B-L.	f Sneed.	½F Tim.	4.68
3685					12800	12850		143½	33x5	Rolls-Royce.....40-50	Own.	6-4½x2½	48.60	Own.	Bijur.	Bosch.	c Own.	Own.	m Own.	F Own.	3.25
3785					13500	12900		118	32x4	Rubay.....	Own.	4-2½x5½	12.10	Strom.	Bosch.	Bosch.	c Own.	Own.	m Universal.	F Own.	5.10
10900	10900	10950			5100	5200		118	32x4	Rubay.....	Own.	4-2½x5½	12.10	Strom.	Bosch.	Bosch.	c Own.	Own.	m Universal.	F Own.	5.10
					5250	5250		118	32x4	Rubay.....	Own.	4-2½x5½	12.10	Strom.	Bosch.	Bosch.	c Own.	Own.	m Universal.	F Own.	5.10
1615	1615		2615d	2615				118	33x4	Sayers Six.....DP	Cont.	6-3½x4½	27.34	Strom.	Delco.	Delco.	s-p B&B.	G-J.	m Arvac.	½F Eaton.	1.75
875	875				5100	5200		108	30x3½	Seneca.....L-2 & O-2	Lyc.	4-3½x5	19.60	Zenith.	A-L.	A-L.	s-p B&B.	G-L.	m Universal.	F Peru.	4.75
985	985				5250	5250		112	31x4	Seneca.....50 & 51	Lyc.	4-3½x5	19.60	Zenith.	A-L.	A-L.	s-p B&B.	G-L.	m Universal.	F Peru.	4.50
		2500	2500e		3300	3400		127	34x4½	Standard.....99	Own.	8-3½x5	33.80	Zenith.	West.	Split.	s-p B&B.	G-L.	m Arvac.	½F Tim.	4.45
2750	2750	2750	2425g		3585	3985		130	32x4½	Stanley.....740	Own.	2-4 x5		None.	Bijur.	None.	None.	None.	None.	½F Own.	1.80
319r	348r	285g			580	645		102	30x3½	Star.....	Cont.	4-3½x4½	15.63	Till.	A-L.	A-L.	s-p Own.	Warner.	m Spicer	½F Tim.	4.87
2250	2250	2450	2275e		3150	3450		125	34x4½	Stearns-Knight.....SKL4	Own.	4-3½x5½	22.50	Rayfield.	West						

You Can Be Specific

in your talk about
the Fedders Radiator
on the car you're selling

THERE is a lot of real interest about it. For while the name and reputation of Fedders Radiators is old as the Industry itself, the special shallow cores that now bear that name are the biggest advance ever made in radiator practice.

They are stronger—lighter—more efficient in heat dissipation per square foot of front surface. The water passages are 36% wider than the average cellular core. They are an actual and obvious mechanical improvement affecting the entire power plant.

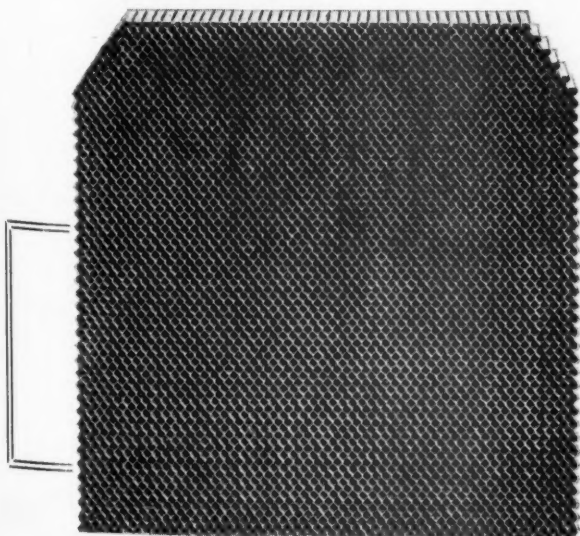
Don't fail to tell your prospect the details about that Fedders Core. It's one of the best sales features on your car.

*If you are not familiar with these details,
write us. It will clinch sales for you.*

*From the beginning FED-
DERS Radiators have
been standard equipment
on quality cars of the best
known makes.*

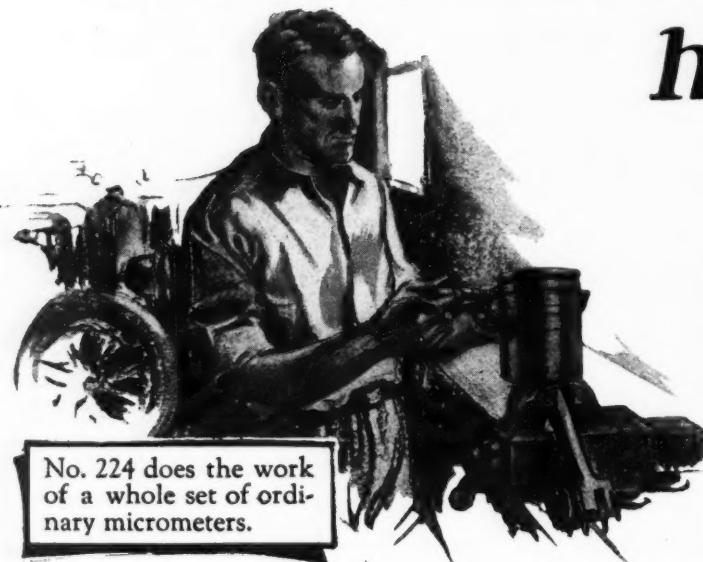
**FEDDERS MANUFACTURING COMPANY,
Inc.**

*Factory and General Offices:
Buffalo, New York*



mechanics!

here's your "mike"



No. 224 does the work of a whole set of ordinary micrometers.

This new Starrett Micrometer is designed specially for the motor servicing trade. A sturdy accurate tool that will take measurements from 2 inches to 6 inches inclu-

sive—at a price much less than you'd pay for the four individual micrometers needed to do the same work.

No. 224 is well balanced and easy to handle. Each anvil has two adjusting nuts to take care of any wear and act as a seat when held in position by the knurled nut.

Suitable wrenches are furnished to make any adjustment. Frame is forged. Decimal equivalents are stamped on the thimble. Provided with lock nut. 2, 3, 4 and 5 inch standards furnished if desired.

THE L. S. STARRETT CO.

The World's Greatest Toolmakers
Manufacturers of Hacksaws Unexcelled
ATHOL, MASS.

**Use
Starrett
Tools**



**NEW STARRETT MICROMETER CALIPER
No. 224**

This new Starrett "Mike," No. 224, range 2 to 6 inches, completely described, along with some thirty other new Starrett Tools, in the Revised Supplement to Catalog No. 22RB Write for free copy.



The Faith of Ruggles Dealers Now Reaps Reward

Many of the present large group of dealers joined us before Ruggles Trucks were in use and before their worth was demonstrated by the tests of actual service that have since taken place.

They had faith in the business policies of this company. They believed with us that a high quality truck sold on a quantity production basis, at a price that made it the *world's greatest truck value*, MUST win through.

This faith is rewarded. Ruggles dealers are dominating their territories. New dealers are seeking franchises. Sales are constantly increasing. The business world has welcomed this national system of transportation economy. We do not believe there is a Ruggles dealer today who would willingly surrender his franchise.

Ruggles Trucks listing at \$795 to \$2195 (chassis) are the greatest value ever offered in the history of the industry. Their price, quality and dependability give them sales possibilities that inevitably mean big income for any aggressive dealer who will take advantage of the opportunity.

*Write or wire us for descriptive literature
and details of the Ruggles franchise*

RUGGLES MOTOR TRUCK COMPANY
SAGINAW, MICHIGAN

Canadian Factory: Ruggles Motor Truck Co., Ltd., London, Ontario

RUGGLES TRUCKS

The World's Greatest Truck Value



The Best in Top Materials

TRADE **Pantasote** MARK
Top Material


The surface-coated material adopted many years ago by cars whose standards of equipment are determined by quality, rather than by cost. Pantasote is different from all other top materials, regardless of names and efforts to produce a similar appearance.

One of the reasons why Pantasote is superior to other surface-coated top materials is that its secret composition has never been duplicated — though years of experiments have produced many imitations.

TRADE **Textasote** MARK
Top Material

A textile material for tops of custom-made bodies and sport models, where something chic in appearance is preferred to the more conventional surface-coated material.

Textasote is a specially constructed fabric, the fibres of which are thoroughly impregnated with Pantasote gum. Textasote is not only smart looking, but is durable, water-proof, mildew-proof and absolutely impervious to the elements in any climate and at any temperature.



THE PANTASOTE COMPANY

11 BROADWAY NEW YORK CITY

SHALER



Vulcanize First—and Make it Last

Tell 'Em You Sell 'Em!

Our national advertising campaign is one of the biggest ever put behind any automotive accessory. We "ask 'em to buy" with full page advertisements. You tell 'em you sell 'em with our posters, window displays, signs, cutouts and circulars to mail out. Write for them.

Think how many Shaler 5-Minute Vulcanizers and Shaler Patch-&-Heat Units this immense national advertising in the best part of the season will help you sell!

Order 5-Minute Vulcanizers from your jobber if your stock is low.

C. A. SHALER COMPANY
213 Fourth Street, Waupun, Wisconsin

Standard Equipment on a Number of Leading Cars

More than 1,500,000 motorists now use the Shaler 5-Minute Vulcanizer for making quick, permanent tube repairs. Every user is a steady repeat customer for the sale of Shaler Patch-&-Heat Units.

NEW IDEAS To Help You Sell

At the gas pump or at the counter—you can make more money selling Shaler Patch-&-Heat Units by asking this easy question: "Got plenty of patches for your 5-Minute Vulcanizer?"

It works. Try it!

**Keystone Rubber Co.,
Moline, Illinois, writes:**

"Your 'Have you plenty of patches?' idea has been tried and it works. One customer had been looking for just such a thing but didn't know what to call for, by its name. We are using the idea pretty much in general now. It applies to a lot of different accessories and we are going to keep it up."



Fig. 1



Fig. 3



Fig. 2

Sell power instead of waste

75% waste

**no waste
All Brake**

The accident usually occurs when the emergency brake doesn't get sufficient grip to stop the car quickly.

Look at Fig. 3 and you'll see why. This shows that only a small proportion of the standard brake shoe grips the surface of the Drum. Put a standard Ford shoe inside a Ford brake Drum—expand it—and note amount of clutch on Drum.

Fig. 1 shows Archer Hinged Brake Shoe expanded. Note grip over **entire** surface of Drum. It contacts the **entire** surface except at end openings. 100% service. Four times the brake power of any other shoe.

Fig. 2 shows Archer Shoe open. Note uniformity of release. Scientific placing of hinge produces this. All Archer Hinged Brake Shoe Features are **patented**.

100% Archer—4 times the brake power—lasts a lifetime—almost impossible to break it.

When the brake shoe grips with *all* its surface—when the contact of shoe against Drum is complete over all—then full power is utilized and the maximum result is attained.

This is exactly what the 100% ARCHER Hinged BRAKE SHOE for Fords does.

Dealers—you can tell the minute you look at the illustration why the 100% Archer offers such huge Sales possibilities.

You can see how it works—why it works—what it does and why the Ford owner needs it and will buy it. Show it to him and sell it. *You know* what 100% Grip on the Drum means. *You know* the real necessity for such a brake shoe. All right then—let's go.

\$1.50 a pair with a fine discount. \$2.00 a pair West of Mississippi. Ask your jobber today or write direct.

Dealers sending for a sample pair will receive a rebate of their commission as soon as received, and literature will be sent with the shoes.

Manufactured by

SAMUEL B. ARCHER

Electrical and Mechanical Engineer
Designer and Builder

Automobiles, Parts and Accessories, also Automatic Special
Machines for Making Any Part of an Automobile

SARATOGA SPRINGS, N. Y.

The **100%** **ARCHER** **HINGED** **BRAKE SHOE** for **FORDS**

There's Profit for You in the extra 75%



You Can Cause a Steel Ball of Atlas Accuracy To Register "Off-Size" by Blowing Upon It

R AISING a half inch Atlas Steel Ball to body temperature by holding it in one's hand or by blowing one's breath upon it, is sufficient to cause it to register "off-size" when mixed with others of the same lot held at a room temperature of 70 degrees.

Yet the expansion of a half-inch ball when raised from normal room temperature to that of the body is only about eight hundred thousandths of an inch (.00008"). But Atlas Balls must not deviate from true size by more than five hundred thousandths of an inch (.00005") generally expressed as one half of 1/10,000"

With the exception of Johansson gauge blocks such accuracy is seldom equalled or even approached in industrial machine elements. So great is the care exercised in the manufacture and gauging of Atlas Balls that after burnishing they are not touched by hand and are gauged in a room held at a constant temperature.

It is because of this great accuracy, the mirror-like finish and high resistance against fatigue that Atlas Steel Balls have won the enthusiastic endorsement of the most exacting ball users.

ATLAS BALL COMPANY

Glenwood Ave. at Fourth St.

Philadelphia

951

ATLAS

ALSO BRASS, BRONZE,

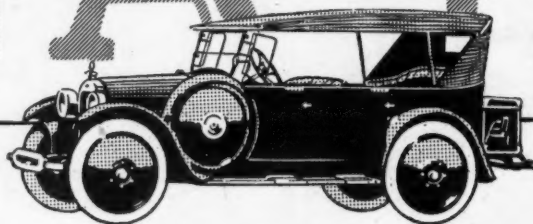


STEEL BALLS

MONEL AND SPECIAL METALS

Made Under
SKF
Supervision

NASH



Nash Gets Quietness with Formica!

NASH is another well-known car that has used Formica non-metallic gear blanks to solve the problem of a quiet front end.

Nash engineers appreciate a material that enables them to retain the well-tried and proven gear drive, with its long life and positive timing—and yet secure a degree of quietness that will match any system of drive that is available.

The high standards of Nash workmanship make it easy to match these gears with negligible selection, and avoid many of the production troubles that have been associated with gears. They find Formica exceptionally uniform. It works well with ordinary tools.

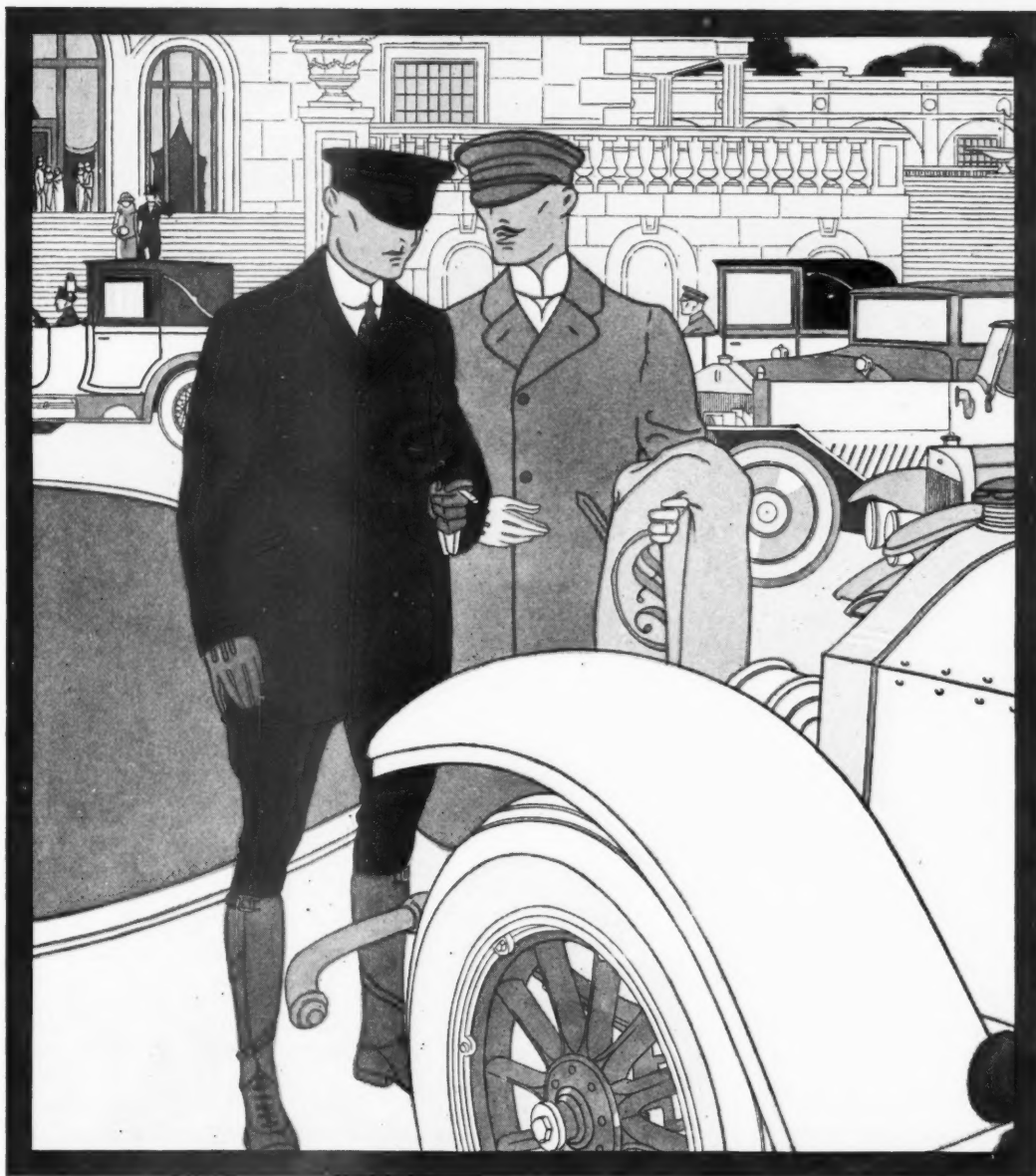
*Write for literature and full information
on Formica gears*

THE FORMICA INSULATION CO.

4642 Spring Grove Avenue, Cincinnati, Ohio

FORMICA

Made from Anhydrous Redmanol Resins
SHEETS TUBES RODS



"How Long Have YOU Had STABILATORS?"

"I thought I was bringing something new into this town when we came back with Stabilators, but now I see them everywhere.

"The fellow Ed drives for has 'em and Joe too and Frank and you! And I bet the rest all get 'em."

In every community as soon as even a few cars have been Stabilated, it is almost literally true that everybody starts talking about them.

Stabilators are a scientifically correct means of maintaining the stable equilibrium of the car body in spite of all rebound, pitching and throwing tendencies.



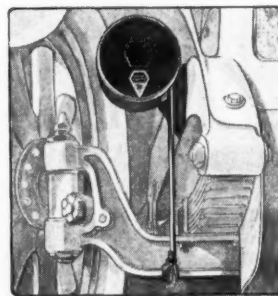
WATSON STABILATORS

JOHN WARREN WATSON COMPANY, PHILADELPHIA

CHANGE THE WHOLE NATURE OF YOUR CAR

STABILATORS are compensating for any size bump or hole. They check lightly when the recoil force is mild and check heavier and heavier as the recoil force increases.

Only **STABILATORS** give this proportionate control to spring recoil.



WATSON
STABILATORS

JOHN WARREN WATSON COMPANY, PHILADELPHIA

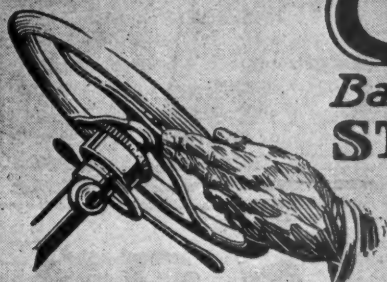
CHANGE THE WHOLE NATURE OF YOUR CAR

—Makes the Ford steer like a big car

C.P.C.

Balanced Pressure
**STEERING
GEAR**

FOR FORDS



The Sight of a Rough Road

IT'S tough enough on the other passengers, but toughest of all on the driver. For it is he who catches the jerks—right through the wheel, where life is just one vibration after another. No wonder the sight of a rough road fills him with dismay!

That is why the C. P. C. *Balanced Pressure Steering Gear* won such instant and widespread popularity, almost from its first day on the market. It stops shocks! It banishes the tendency of the car to jump out of its tracks and wander from one side of the road to the other. It holds the car in its course. A slight pressure of the fingers on the wheel gives the driver absolute control. It can't lock in any position—it obeys the driver's slightest touch. Vibration, discomfort and danger are gone forever!

Ask any Ford owner how he'd like **THAT** kind of steering. He's a prospect immediately. The new comfort appeals to him—and the low price clinches it. Very easy to install. Very profitable to sell. Let us tell you why. Write for dealer and jobber plan today.

Price
\$16.50

Ford Registration
— 1922
4,800,000 - Cars
750,000 - Trucks

RECORDING DEVICES COMPANY

12 Norwood Avenue,
Dayton, Ohio

Fills a universal need for the universal car

(1)

TWO SLIDING HEADS of drop forged steel, one right and one left, each with straight tooth rack, serve to balance stresses, making steering both safe and easy.

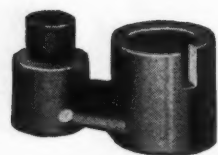
(2)

TWO SPIRAL NUTS, hardened and ground, turning with main shaft, to which they are keyed by splines, cause the sliding heads to travel in opposite directions, up and down.

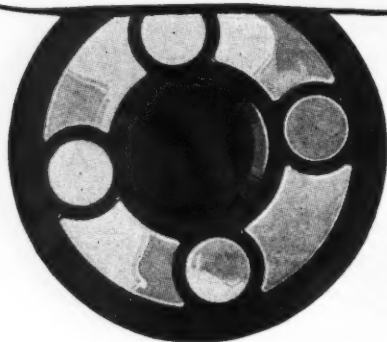
(3)

THE TRUNNION SHAFT teeth engage the racks of the sliding heads, under the push and pull of which the trunnion shaft turns. Four teeth in contact, two in each rack, give nearly three times the contact afforded by the worm and wheel type of gear.





a "real" timer ~ and



Only 4 Parts

THE "BINGO" All-Metal Track

The all-metal track and contact points are of brass, imbedded in the molded Bakelite distributing head and extending 1/16-inch beyond its surface. The "raised-track" construction insures long life.

The air-gaps that separate the "all-metal track" from the contact points are something NEW in timer construction. Their purpose is to allow the brush a clean "make and break"—the same method used on armatures for years.

"BINGO" BRUSH AND CASTING

The brush is of a graphite and copper composition—and therefore self-lubricating. The rotor is die-cast which insures accurate timing.

"BINGO" DISTRIBUTING HEAD

—of molded Bakelite and therefore waterproof—also fool-proof against "grounds" and "short-circuits".

"BINGO" TIMER HOUSING

The ring holding the distributing head in position is of solid brass, nickel-plated.

Your INITIAL ORDER AT MANUFACTURING COST—that's our proposition to you, Mr. Dealer. We need YOU—your selling talks to your customers—to put the "BINGO" over in a big way.

That's why we are offering you this extraordinary opportunity—we want to pay you well in **RICH PROFITS** for your time and trouble.

Our display cards and other dealer helps will assist you—bring customers into your store to buy.

Once sold the "BINGO" stays sold and repeat orders will come. For the "BINGO" is an accurate timer—dust-proof, waterproof, fool-proof and unqualifiedly guaranteed.

On a recent blocktest, the "BINGO" timer was run 3500 miles continuously. The micrometer showed practically no wear on the track and only 3-1000 of an inch on the brush. Give your customers such a timer and they'll come back for more.

Fill out the Coupon TODAY!

Make a REAL PROFIT on your timer sales

The Wm. Deddens Manufacturing Co.

35 East Front Street

Cincinnati, Ohio

a real proposition

TIMER

BINGO

FIRES EVERY TIME

THE WM. DEDDENS MFG. CO.
35 E. Front St., Cincinnati, O.
Gentlemen: Send me details of your "doubled profits" propositions on Bingo Timers.
Name.....
Address.....
City.....
State.....

STONE

RIMS, RIM PARTS and Allied Products



"Lucky we carried 2 spares"

The STONE Extra Spare TIRE-CARRIER

DOUBLE trouble often comes on a single trip. So always carry TWO spare tires for double protection. It's the 1923 way—and it's easy with the ingenious new Stone Carrier. The three members clamp securely to the "regular" spare rim. Fits all cars and improves their appearance. On and off in a jiffy. No ropes or straps. Does not chafe nor interfere with tire-covers, tail light or license plate. Sizes for 3½, 4 and 4½-inch straight side rims and 3½-inch clincher. In ordering, specify size of your rims and whether straight side or clincher.

Write today for interesting leaflet about the tire-carrier for your car

Sold in garages and accessory stores. Dealers supplied by jobbers. \$3.50 per set of 3; for Ford's \$3. Write us, giving name of car.

Stone Rim Parts Service Everywhere

Stone supplies Rim Parts for all cars. Near you is a dealer who displays the Stone Cabinet—who has right rim parts for your car. Lugs, bolts, nuts—tight-gripping, long-lasting. Always carry Stone Rim Parts for emergencies. Buy today—by name—Stone

The STONE MANUFACTURING CO.
1502 S. Michigan Avenue, Chicago 135 Wooster Street New York

We also manufacture the Stone Interchangeable Rim. Replaces 20 different makes of rim.

—another Post ad

In last month's Motor Age, Motor World, Automobile Trade Journal and Automotive Merchandising appeared miniature reproductions of one of our large advertisements in

THE SATURDAY EVENING POST

Here is another! Others will appear throughout the season. They will build new trade for YOU.

"The First 20"

For profit's sake, follow the example of America's leading jobbers who include Stone Products among the "First 20" for sales concentration. The Stone Carrier is a fast, easy seller, because car-owners know it and need it. It helps you sell more rims and tires. Retailers \$3.50; Ford size \$3. Signs free. Ask your jobber.

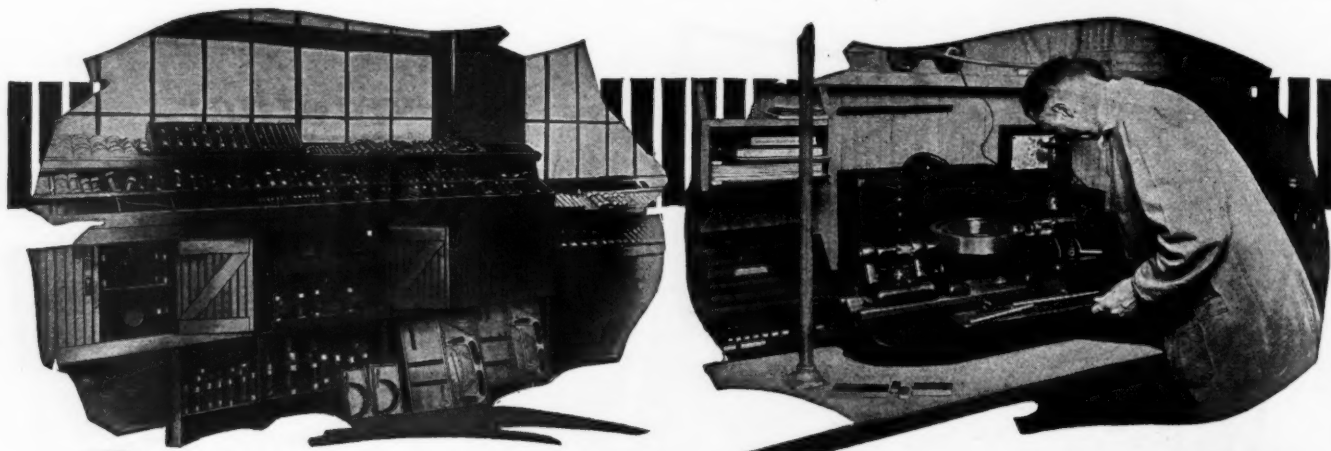
The Stone Manufacturing Company, 1502 S. Michigan Ave., Chicago
135 Wooster St., New York

We also make Stone Interchangeable Rims and Stone Shock Absorbers.
Complete service on rims and wheels—all makes.

CABINET FREE WITH STONE RIM PARTS

Stone Rim Lugs, Bolts and Nuts are great Money-makers. The Stone Cabinet or Display Board—FREE with orders—will help you sell. Cabinet has Removable Index Labels—an exclusive Stone feature. Ask your jobber.





Temperature & Master Gages

That there may be no variation in measurement due to expansion and contraction, the temperature of the glass-enclosed and dust-proof room in which STROM Master Gages are kept is most carefully regulated.

At regular, frequent intervals the shop gages are brought to this test room and compared with the Master Gages and with a standard comparator checked to .00001 of an inch. No variation from laboratory standards is permitted in the STROM output.

Maintaining accuracy of measurement means maintaining minimum of friction. STROM Ball Bearings as nearly approach perfection in measurement as untiring human watchfulness and constant machine precision can make them. Power flows through them with almost no resistance.

STROM guaranteed ball bearings deliver the maximum of power from motor to wheels

"Wherever a Shaft Turns"

(1975A)



Strom

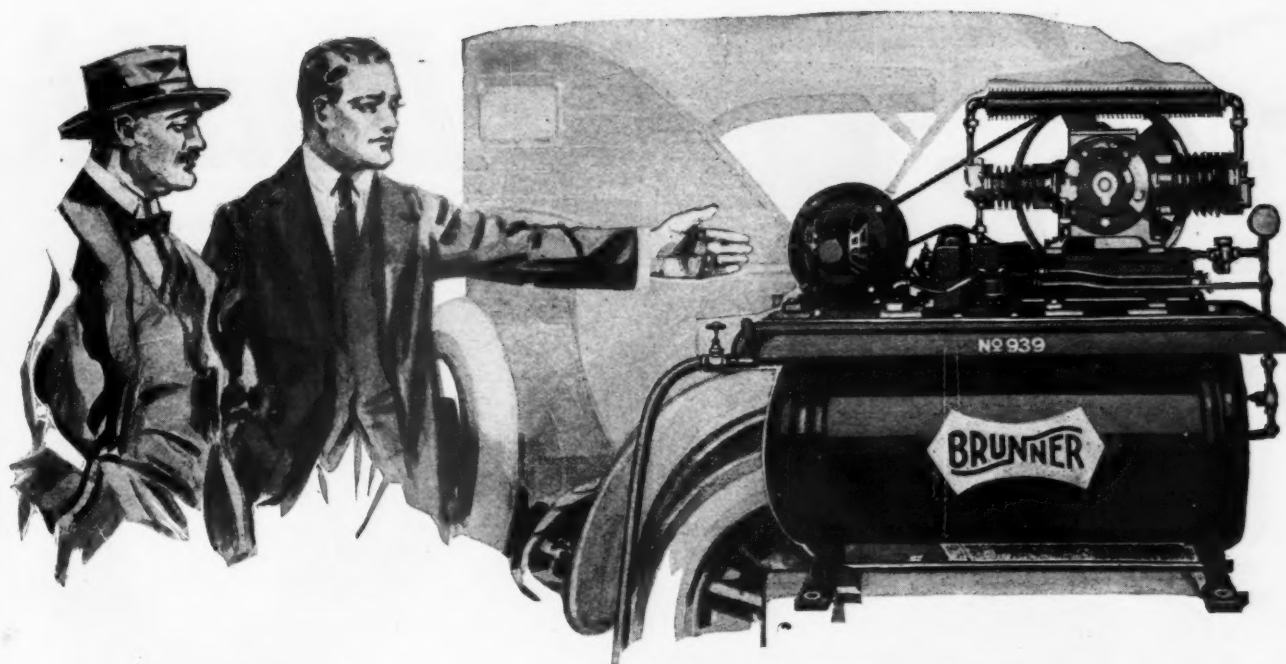
BALL BEARINGS

U. S. Ball Bearing Mfg. Co.
(Conrad Patent Licensee)
4551 Palmer St., Chicago, Ill.



An Organization
Built for Precision

Scientific in Principle
and Practice



It's Easy to Own a Brunner!

BRUNNER



2-Stage 1923 Model

with 20 Exclusive Features,
a few of which are:

2. Extra large Intercooler insures low temperatures for second stage.
4. Improved Belt-Tightener with Hardened and Ground Shafts and Oil-Less Bearings.
5. Ground Bearings, Cylinders, Pistons, Piston Rings, Wrist Pins, and Crankshaft.
6. Removable Cylinders—making repair and replacement cheap and easy.
7. Forked Type Connecting Rods—minimizing the vibration common to most 2-stage compressors.
11. Every Part built on Special Tools and Gages, insuring absolute interchangeability.
15. Seamless Steel Tank—insures absolute safety. The only compressor made using this expensive type of tank.
17. Solderless Compression Couplings of most efficient type.
18. Brunner Patented No. 73 Safety Valve—Absolutely Air Tight.

Brunner Jobbers Quote Terms to Meet Your Financial Requirements

Brunner Compressors are a help to their owners, not a hindrance.

Their prices are the lowest in the world for the value delivered.

Their cost per year is almost nothing when stretched over the twenty years of perfect service which they render.

But—in addition—a Brunner can be obtained on terms of payment that make it almost possible to collect the money for its purchase from the service of the machine itself.

Arrangements have been perfected whereby every Brunner Jobber is empowered to offer his customers these terms.

Ask your Jobber's Salesman about this.

Your own Jobber almost certainly handles Brunner Compressors, and will be glad to make it easy for you to buy one.

BRUNNER MFG. CO., Utica, N. Y.

*Oldest and Largest Manufacturers of Garage Air
Compressors in the World.*

*Sales Offices: Cincinnati, Kansas City, San Francisco, and almost every Jobber
from Coast to Coast.*

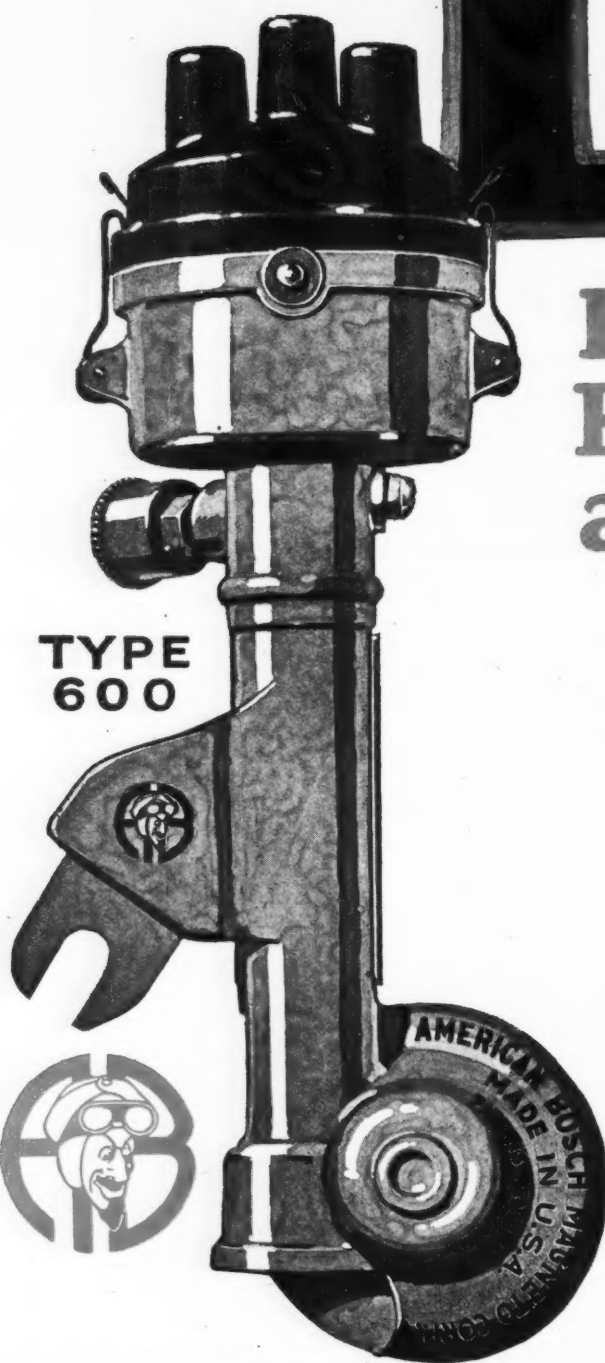
"Good for Twenty Years at

BRUNNER
AIR COMPRESSORS

Hard Labor"

The new **BO** Double

High Quality Ford Ignition at Low Cost—



The Bosch De Luxe Ignition System, Type 513, is so designed that it becomes a definite part of the engine. This system, which includes the Bosch Coil and Compensating Governor, is made for battery equipped Fords of 1919 and later. It is remarkably efficient and dependable. Price, \$25.00 complete.

Someone in your town is going to sell a lot of Type 600 Bosch Ignition Systems this year—

He's going to make a lot of money selling them—and he'll make a lot of new friends, too.

Beat your competitor to it—get a stock of Type 600 Systems and start a sales drive immediately. You can sell them right over the counter.

You'll make a hit with every Ford Owner you sell. He'll be so delighted with his purchase that he'll tell all his friends.

your sales!

SCH

Ignition System For FORDS

Sales will be a cinch after that—every purchaser will be out boosting for you—you'll have the biggest sales force in the country.

Now's the time to get started. Don't wait till your competitors down the street get a shipment in and start working on your customers. You can make a clean-up this year if you act immediately.

Wire the nearest Bosch Branch for new sales plan and a sample fitting C. O. D.

American Bosch Magneto Corporation

Main Office and Works: Springfield, Mass.

New York

Chicago

Detroit

San Francisco

WHAT IT DOES

- 1—Makes Easy Starting
- 2—Keeps Plugs Clean
- 3—Prevents "bucking"
- 4—Gives More Power
- 5—Saves Gas and Repair Bills
- 6—Stops Timer Troubles
- 7—Pays for Itself
- 8—Prevents Short Circuits
- 9—Cuts Down Vibration
- 10—Eliminates Spark Lever

\$12⁷⁵
and Tax

Ask Your Jobber for

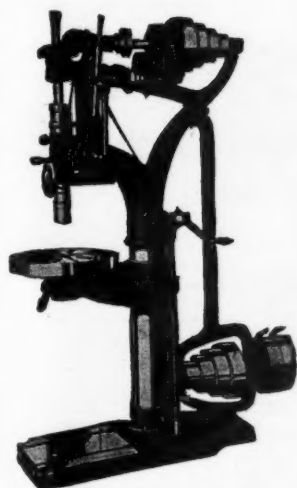


Rack FREE with Your
Initial Order for 25 Springs

VULCAN
QUALITY

SPRINGS

JENKINS VULCAN SPRING CO., RICHMOND, IND.
Boston Dallas St. Louis San Francisco Portland Seattle



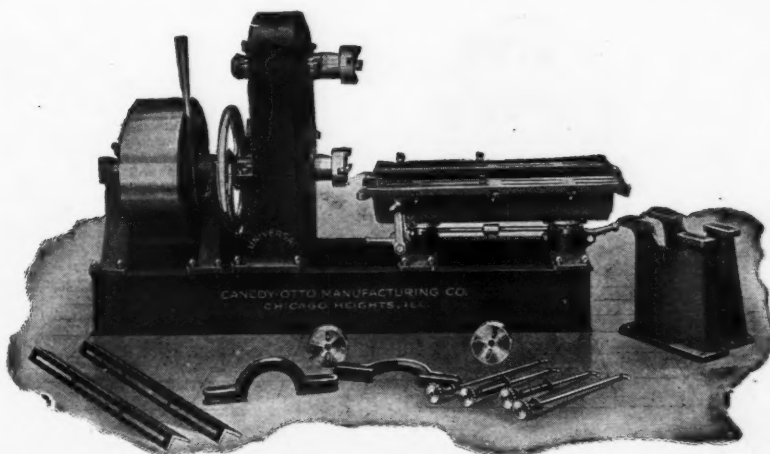
C-O 20" Drills combine the most advanced operating facilities with capacity for heaviest work. Three feeds are provided, power, wheel, and lever, with separate lever for quick return of spindle. Actual work diameter, 21 1/4". Spindle travel, 12". Distance from table to base, 48".



C-O Universal Connecting Rod and Piston Aligners withstand the heavy wrench of straightening connecting rods without going out of line in the slightest. Built to highest precision standards, with hardened and ground pins and bearings. Indispensable for high grade, accurate work.



C-O No. 00 Rubber Buffers and Polishers are invaluable for ripping off old rubber and roughing treads. Can also be used for grinding, with the rest provided. Extra long spindle gives room for large tires. Bearings are furnished, fitting 100 per cent. Furnished with tight or tight and loose pulleys.



The Greatest Single Improvement Ever Made in Shop Methods!

Forty minutes versus forty hours!

That is the saving in time made possible by C-O Universal Burning-In Machines, in the all-important operation of fitting engine bearings.

Not only is the work performed in a fraction of the time required by hand methods, but a 100 per cent improvement in quality results as well.

Think what this means in increased service and satisfaction, in added reputation and good will!

The C-O Universal Burning-In Machine is the one machine that provides every facility for a quick and perfect job of burning-in and running-in bearings, regardless of the type of engine or its size. Use of the upper or lower spindle, as required, places all bearings in full view during the burning-in operation, an essential requirement for good work. The single table control, another exclusive feature, assures automatic alignment of the engine crankshaft and driving spindle.

An oil sump in the table, acting as lower half of the engine crankcase, supplies adequate lubrication to bearings during the running-in operation. Provision also

is made for running-in engines under their own power, an invaluable power saving feature.

Detection of motor noises is made easy by the silent chain drive. The hand wheel enables the convenient testing of bearings for a perfect fit. No vibration is experienced, due to the rigid mounting on the heavy channel base.

Here is undoubtedly the greatest advance that has ever been made in shop methods. Hundreds of these machines in use prove conclusively their unequaled ability in time and money saving. Write for catalog, describing and illustrating in detail this and other C-O short cuts to bigger, better profits.

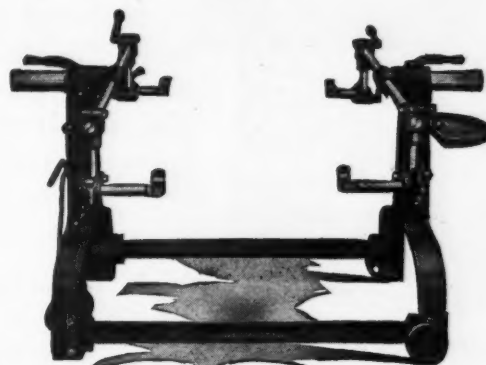
Address Dept. A

CANEDY-OTTO MFG. COMPANY

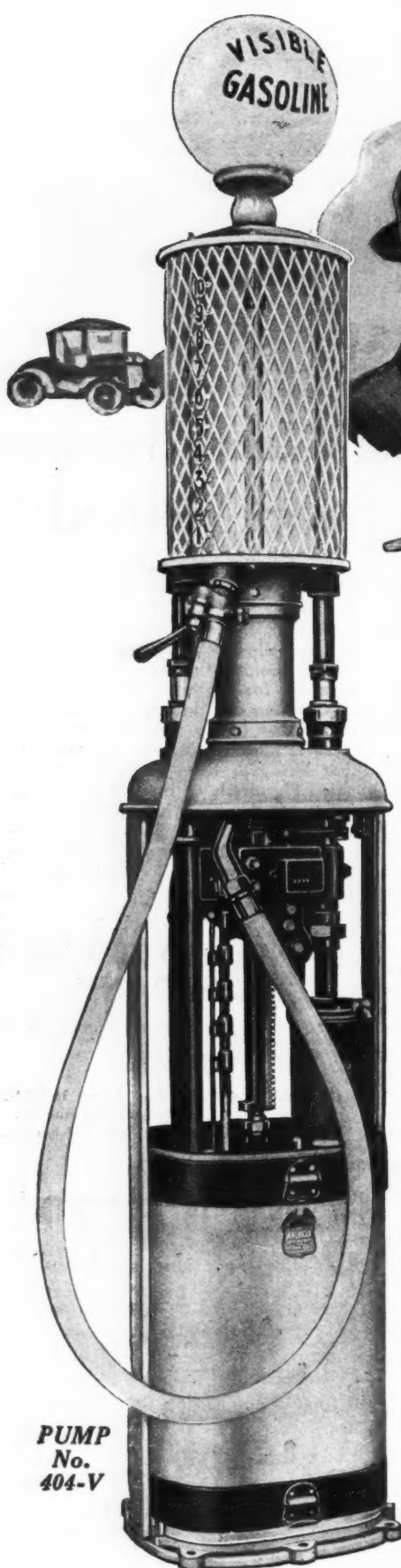
Manufacturers of Automotive Equipment, Drills, Punches, Shears, Shrinkers, Countershafts, Grinders, Buffers, Forges, Blowers, Tugers Irons and Blast Gates

Main Office and Factory—Chicago Heights, Ill.
New York Branch—407 Broome St.
San Francisco Branch—952 Folsom St.

CANEDY-OTTO
"The Well-Equipped Shop"  **OTTO**
Gets the Business"



The C-O Universal Motor Stand handles any make or type of engine without extra fittings or attachments. Work is held securely and in perfect balance. Friction clamps permit instant change to any position desired. The simplest and most flexible stand built.



PUMP
No.
404-V

CONTAINERS

Either five or ten gallon visible containers for other makes of pumps furnished complete with full instructions for attaching.



Why not 10 Gallons Instead of Five?

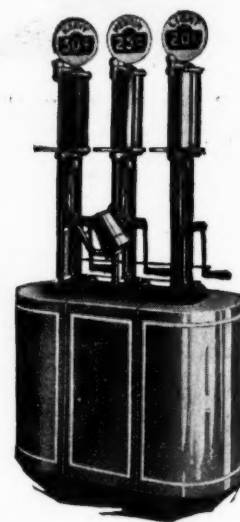
It's just as easy to sell ten with this 10 Gallon American Visible Pump—and your SALES and PROFITS are both increased. And it SAVES your customer ANOTHER STOP.

American *Visible Curb Pump*

The 10 gallon pump has all of those desirable features and superior qualities that have made the American Visible the leader among visible pumps.

Its action is positive and quick—it is hand operated, absolutely safe—no danger from breakage, fire or explosion. All the gasoline is filtered, and an accurate meter, furnished without extra charge, registers all gasoline pumped into container.

Write us for full information and our VERY REASONABLE prices.



American Visible
Lubricating Outfit

Serves clean oil quickly. Pump forces oil into measure—no dripping—no waiting for gravity flow. Holds three grades of oil—mounted on casters to roll in and out of garage. Convenient, attractive and more than doubles the sales of oil.

The American Oil Pump & Tank Co.
1159 FINDLAY STREET, CINCINNATI, OHIO



*Couldn't you sell
this man
a long-handled jack?*

There's no way out of it, he has to kneel down in the street—and almost crawl under the car—to get his short handled jack under the axle.

Would he pay \$4 to \$5 for a 34-inch handled jack? You can bet your bottom dollar he would. And he would give you his old jack to boot.

Who is this man?

Isn't he the fellow who buys his gas and oil from you, who brings his car in to have the carbon cleaned out or some tinkering done?

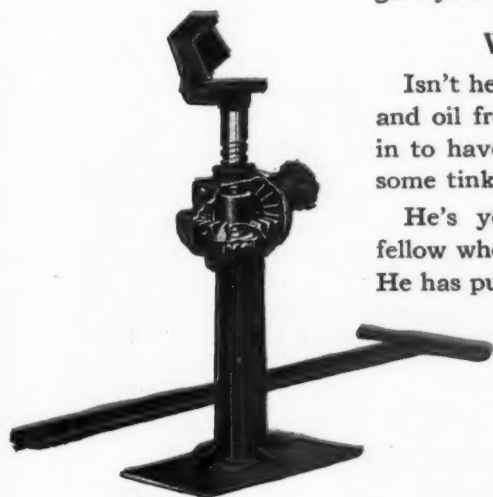
He's your average customer—the fellow who keeps your business going. He has punctures now and then (they

all do); and when he does, he is bound to cuss at the short handled jack which came with his car.

"I always wanted a long-handled jack"

Have you shown him the new Reliable No. 5-A, the jack with the 34-inch detachable folding handle and a positive screw action working on ball bearings? Show it to him the next time he comes in and tell him the price is less than a "five spot."

Watch him twist the handle a few times, give a grunt and tell you "I always wanted a long-handled jack but I thought they cost at least \$10.00."



Elite Manufacturing Company

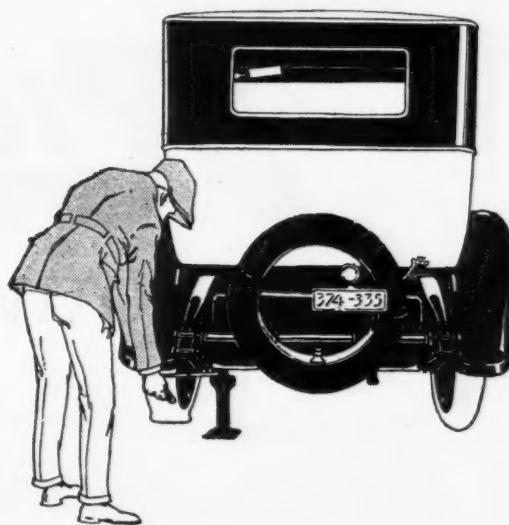
Department MA5 Ashland, Ohio

COMPLETE STOCK CARRIED BY: { Northwest Branch—G. A. Ashton Co., St. Paul, Minn.
Southwest Branch—Carroll Company, Dallas, Texas

REPRESENTATIVES: { Motor Products Company, 149 Church Street, New York
L. E. Spencer Company, 704 Stahlman Bldg., Nashville, Tenn.
A. E. Mohrig, 1454 Pine Street, San Francisco, Cal.

Over 5,000,000 Reliable Jacks have already been sold. To get you started making your share of these profits, we will mail you one of these jacks and bill you through your jobber. Just write his name on your letterhead and mail it in.

**RELIABLE
JACKS**



Tie Up With the Growing Demand *for* **RIE NIE** **FAN BELTS!**



Undeclared in performance, Rie Nie Fan Belts have rapidly wedged their way to unrivalled leadership in the fan belt field. While car, truck and tractor drivers make ready for summer work and travel, dealers who prize contented customers and generous profits, are making ready to meet Rie Nie Fan Belt demand. Scientifically constructed, with all excess stretch removed, Rie Nie "Vee Round" and "Flat Type" Fan Belts will not break nor rot. At all times they drive the fan at the necessary speed for most efficient cooling.

Rie Nie Fan Belts assure motorists freedom from overheated engines and resultant motor damage. Rie Nie Fan Belts assure **YOU** freedom from unprofitable, cling-to-the-shelf merchandise. Made in standard sizes, they involve but a minimum investment for maximum returns. As a **big step** toward **bigger business**, stock Rie Nie Automotive Products! If your jobber cannot supply you, send your order direct to us. Catalog and prices upon request.

Durkee-Atwood Co.

Minneapolis

Minnesota

Rie Nie
TRADE MARK

AUTOMOTIVE PRODUCTS

What Magic Words does Dealer Benson Use?

You'd like Benson. He has the knack of going right to the bottom of things. I think that is the reason for his unusual success.

When I saw him not long ago, I said, "John, I have watched you sell stuff every trip here for two years. You have anything beat I ever saw. You sell 'em twice as much as they came for and make 'em like it. What kind of magic do you talk?"

"No hokus-pokus to it," John an-

swered; "just a rule my old boss used to drill into me. He used to say 'It's the extra sales that make the profit. Ask 'em to buy and get next to their human nature.'"

"I don't give a hoot for a salesman that don't know human nature. Every article that is worth selling has one big point of appeal. On the Rose Tire Pump it's Easy Pumping."

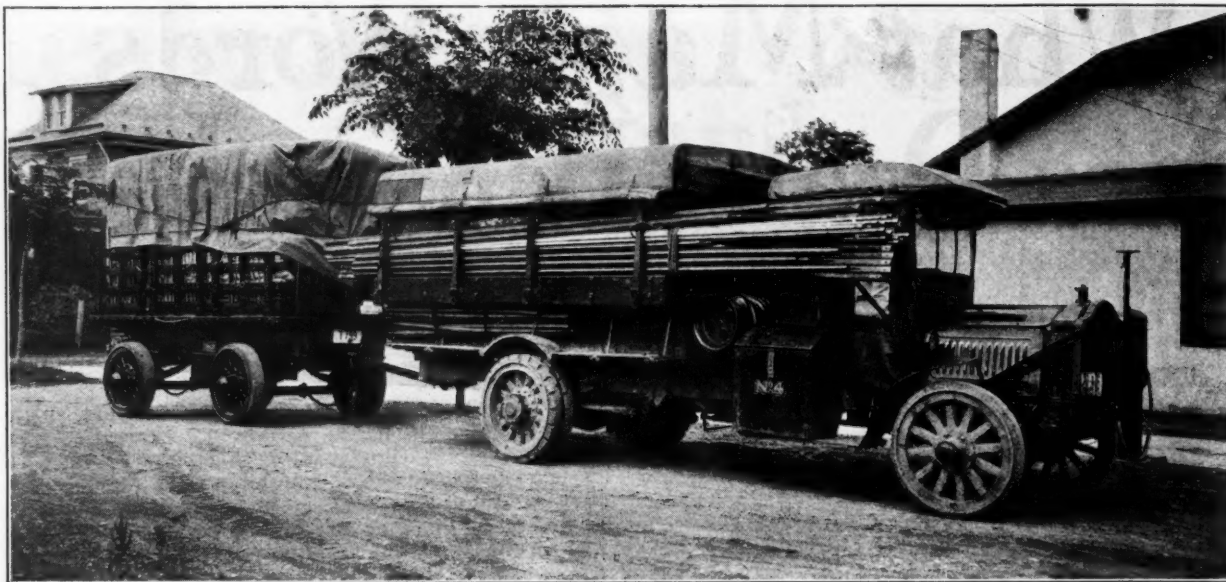
"I like to ask 'em to buy a Rose because Easy Pumping has such a big human nature appeal. It's a weakness with every car owner. I have sold hundreds of pumps that way."

FRANK ROSE MFG. CO. HASTINGS, NEBR.

ROSE TIRE PUMP

Salesmanship, after all, is just a matter of appealing to human nature. You'll sell more Rose Tire Pumps by talking Easy Pumping, than any other way.





One of the outfits belonging to A. J. SORDONI, Forty Fort, Penna. Trailer is loaded with camp equipment, truck with tools and material for building transmission lines.

Troy Trailers in a New Field

Mr. Sardoni has found another use for TROY Trailers. This is in connection with Transmission Line work. He has several trailers which are used for different purposes. One is especially equipped for camp cooking, while the others are used for transporting materials to and from the job.

He says:

"In reference to my experience with TROY Trailers, I find them very satisfactory."

Are you interested in increasing your profits? If so write us at once, it might be your territory has not been allotted.

THE TROY TRAILER AND WAGON COMPANY

Builders of hauling equipment for over thirty-five years

Mulberry Street

Troy, Ohio



The Transcontinental Oil Co., New York City, N. Y. Note the manner in which this company is using their trailer.



The J. L. & H. Stadler Rendering & Fertilizer Co., Cleveland, Ohio. Outfit consists of special length TROY Trailer capacity 5 tons and White Truck.

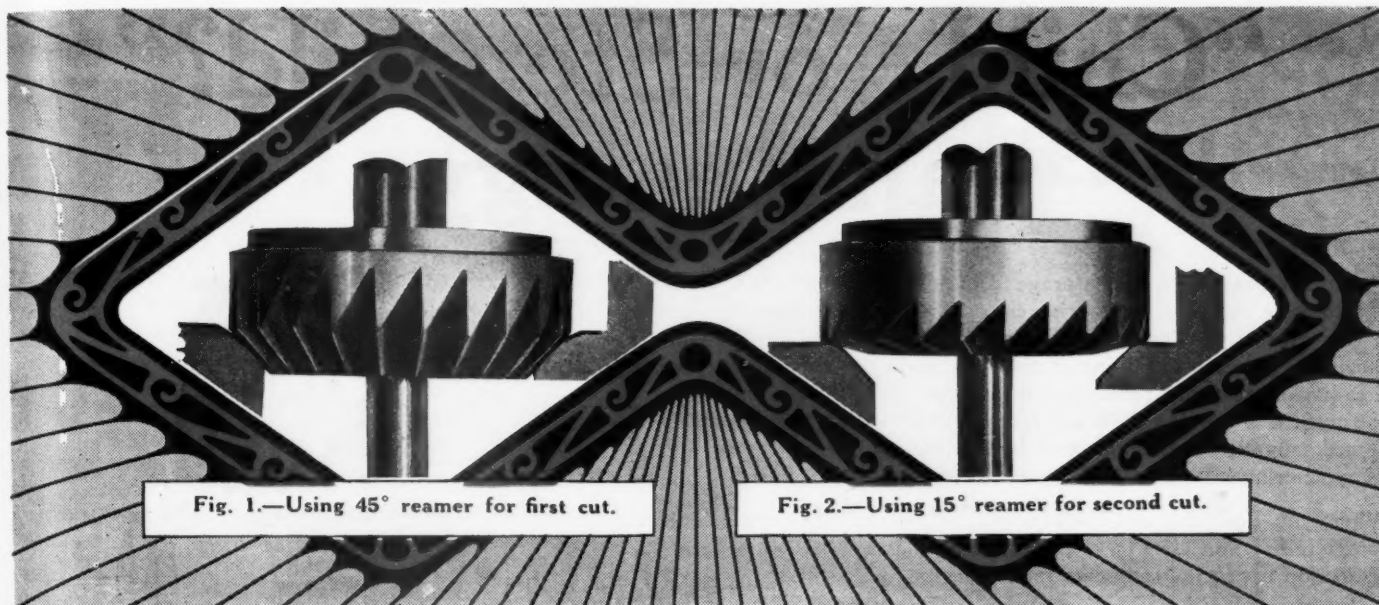


Fig. 1.—Using 45° reamer for first cut.

Fig. 2.—Using 15° reamer for second cut.

How to Reface Valve Seats for More Accurate Fitting

IN reaming valve seats mechanics often find difficulty in centering the reamer over an uneven guide hole.

When this happens it is necessary to recut the valve seat to get it into alignment with the hole. Then, after reaming a second time, it is usually found that the seat has been reamed so far that it is too wide for a good tight seating of the valve and often with a bearing surface wider on one side than on the other.

This difficulty is avoided, and a quicker and more accurate job obtained, by proceeding as follows:

Make the first cut at 45° in the ordinary way with the Sioux Valve Seat Reamer. (See Fig. 1.) Then take a 15° Sioux Reamer and bevel off the top of the valve seat as shown in Fig. 2. Work down until the lower line of the 15° cut measures a little below the outside diameter of the valve face.

Now take your 75° Sioux Reamer and reface the lowest

part of the valve seat as shown in Fig. 3. Cut down until the upper line is a little above the inside diameter of the valve face.

Your valve seat will now appear as shown in Fig. 4, and in absolute alignment with the guide hole. It is now perfectly centered and the proper width for most lasting results. The 15° and 75° reamers can be used with the same results on the 30° or 60° valve seats.

All possibility of chattering of valve seat is prevented simply by inserting a piece of 50 lb. wrapping paper, large enough to cover valve seat, on the stem against cutting points of reamer. Write for free sample.

When ordering 15° and 75° valve seat reamers the 15° should be the same size as the valve head, and 75° in most cases should be approximately 1/8 inch smaller.

Any size 15° and 75° Sioux Reamer may be obtained at the same prices as corresponding sizes of 45° reamers.

Write for catalog and valve seat reamer specifications.

ALBERTSON & CO., SIOUX CITY, IOWA

Your Jobber Sells Them



Fig. 3.—Using 75° reamer for bottom cut.

Fig. 4.—Valve seat finished with proper width for valve.

"Child—or Stepchild?" an analogy

Maximum pressure—tank storage capacity—motor characteristics—automatic starting duty—frequency of operation—these are but a few of the problems peculiar to air compressors for free air service in garages and filling stations. It is to the purchaser's own greatest interest and protection to see that his CURTIS compressor outfit is a genuine CURTIS factory built product, factory guaranteed, supplied and sponsored by a designing, engineering and manufacturing institution with a career of 69 successful years.

When you purchase a CURTIS garage compressor outfit, built complete by the CURTIS organization in the CURTIS plant, your protection lies in the following facts—

- 1—The proper relation and suitability of component parts. No misfit motors, switches and the like. Speeds, loads and capacities are right, starting loads are eliminated and there is a consequent freedom from trouble and expense which the chances favor in an amateur assembled outfit—a "step-child" at best.
- 2—A complete unit tested as a unit under its own power in addition to the usual separate test of component parts; a final check-up under your actual running conditions duplicated in our shop.
- 3—The CURTIS guarantee covers the *entire unit* as a whole and the CURTIS organization stands back of it as a unit; no divided responsibility, no shifting of the blame for possible trouble later on,—“no passing of the buck.”

We manufacture a complete line of both single and two-stage air compressors. A style, size and arrangement to meet your particular need. Write at once for full details and prices.

CURTIS PNEUMATIC MACHINERY CO.

1527 Kienlen Ave.

St. Louis, Mo., U. S. A.

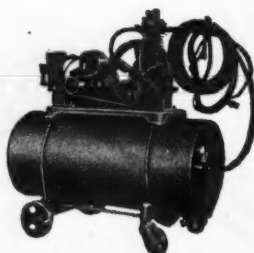
Branch Office: 530 H. Hudson Terminal
New York City

Canadian Representative: Joseph St.
Mars, Winnipeg and Toronto, Canada.

"An Original Design"



Style "S"
Single-
Stage
Outfit
Belted only.
Five sizes, ¼
to 3 H.P.

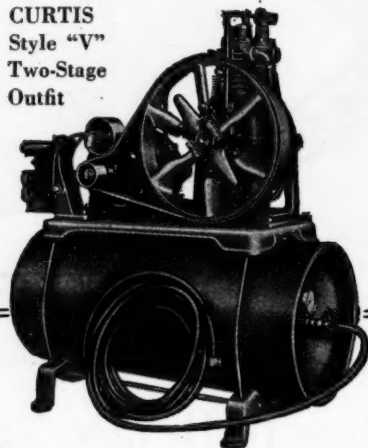


Style "X"
Single-
Stage
Outfit
Portable, Belted
or Geared.
Five sizes.
A.C. or D.C.
Motor.



Style "Z"
Single-Stage
Outfit
Belted only. ¼ to 3
H.P., A.C. or D.C.
motor. Five sizes.

CURTIS
Style "V"
Two-Stage
Outfit



A two-stage compressor is only as good as its intercooler.

(a) COPPER Intercoolers with thin radiating fins rigidly attached are original with CURTIS two-stage compressors. One hundred and thirty-five per cent better heat-conducting properties than cast iron, 112 per cent better than steel and 27 per cent better than aluminum

(b) CURTIS Intercoolers are approximately 50 per cent longer and have about 100 per cent more heat-radiating fins than competing designs.

(c) CURTIS Intercoolers are exposed their entire length to the cool blast of the fan flywheel.

All the features of the CURTIS Single-Stage, plus real two-stage efficiency.



CURTIS *Single and Two Stage* Air Compressors

Send
Coupon

Curtis
Pneumatic
Machinery Co.
1527 Kienlen Avenue
St. Louis, Mo.

Gentlemen:
Please send me full details
on Curtis Air Compressors,
your proposition and prices.

Name.....

Address.....

Jobber's Name.....

Address.....

BUNTING BUSHING BEARINGS



"Your Bunting Bushings are ready whenever you are."
—Baby Bunting

Bunting Bushings Give Permanent Value to Service



BUNTING Piston Pin and Spring bushings squarely meet the growing demand from automotive jobbers and service men for replacement lines that are nationally and favorably known.

You not only render service when you sell or install Bunting Bushings but you deliver the additional value of known quality and national prestige.

Automotive Distributors — Write for List No. 111 giving description and prices of Bunting's "Ready Made" Spring bolt bushings and List No. 18 showing Bunting Piston Pin bushings for all popular cars, trucks, tractors and motors.

Cored and solid bars of Bunting Phosphor Bronze Bearing metal in 31 stock sizes.

THE BUNTING BRASS & BRONZE COMPANY TOLEDO . . . OHIO

NEW YORK
245 West 54th Street
Circle 6844

CLEVELAND
710 26 Clair Ave. N.E.
Main 5991

BOSTON
38 Oliver Street
Main 6488

SAN FRANCISCO
198 Second St. Cor Howard
Douglas 6645

CHICAGO
712 So. Michigan Ave.
Windsor 5133

"The Nationally Advertised Line"

Big space in the greatest advertising medium in the world is telling car owner and dealer the value of re-bushing pistons and springs with genuine Bunting Bushings.

For years Bunting Bushings have been preferred by manufacturers and designers. Enormous quantities are used in original production.





The veil is rising fast! The name and the news of this new wonder car will be flashed throughout the country on May 12th. Remember the date!



THE announcement of this exclusive car will long stand as one of the great events of the industry. A commanding center spread in colors in the Saturday Evening Post of May 12th, big space in America's principal newspapers, powerful 24-sheet posters, and other advertising will make this beautiful car famous overnight—the center of interest and the talk of America!



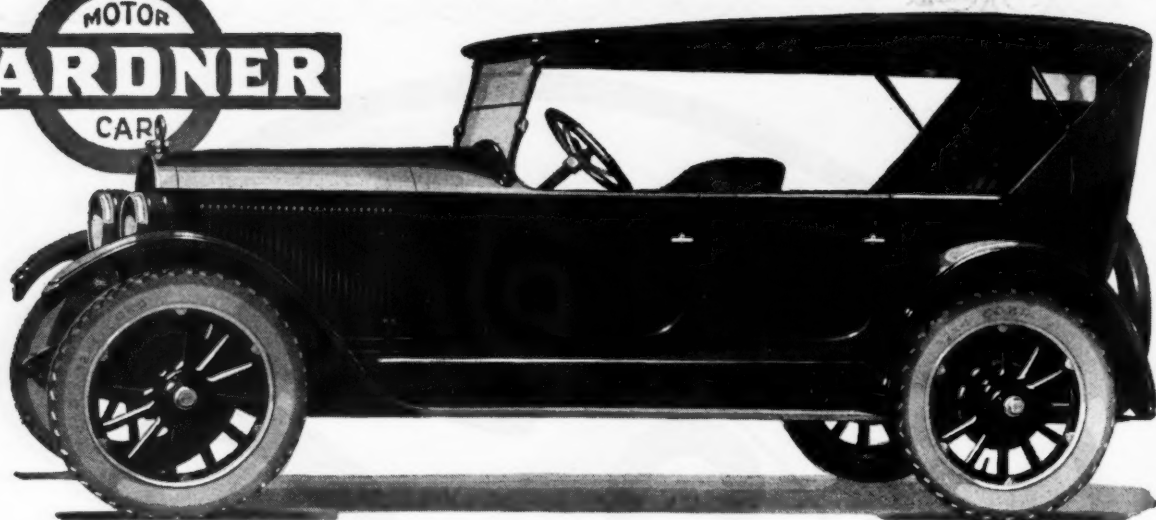


Over five thousand live dealers have already made application for franchise to sell this wonder car.

In every community it fills a market never before reached! Are you the dealer that wants to command this open sales market in your community? If so, write at once for details. Next week your city may be closed! Address:

"Leading Manufacturer,"

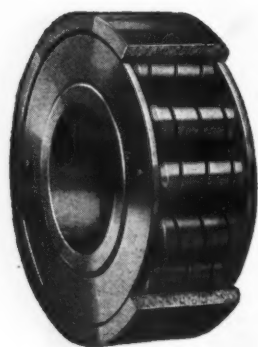
Care Dept. 27, MOTOR AGE,
5 So. Wabash Ave., Chicago, Ill.



HYATT

Quiet

Roller Bearings



The many engineering refinements that are embodied in the new Gardner are the outcome of the earnest desire of its manufacturers to provide a still greater dependability and economy.

Realizing the many advantages that follow the use of Hyatt roller bearings, Gardner engineers specified these bearings in the rear axle construction.

By carrying the gear load at the differential and the car's weight at the hubs Hyatt roller bearings help to assure for Gardner owners a rugged, quiet, trouble-proof rear axle.

HYATT ROLLER BEARING COMPANY
Newark Detroit Chicago San Francisco

Worcester Milwaukee Huntington, W. Va. Minneapolis Philadelphia
Cleveland Pittsburgh Buffalo Indianapolis

Hand your customer
this package of
satisfaction



**The straps they see
and buy**

Motorists find it hard to pass by a display of Gilmer Tire and Luggage Straps. The display board stops customers—plants the idea of buying a strap—sells the Gilmer product. The dealer profits without effort. Invite these easy sales in your store.

GIVE your customer confidence in the long trip, and yourself two sales for every one. Sell him the new Gilmer Super-Service Fan Belt in the twin package.

The very appearance of this new belt promises long life. The metallic finish gives it greater resistance to heat, oil and water, those greatest enemies of fan belts.

Sell this belt the way it comes—in pairs. One goes on the motor. The spare goes in the tool-box—it is sealed in a glassine envelope to keep it clean until used.

This Gilmer Super-Service Fan Belt will make friends for itself and for you.

L. H. GILMER CO., Philadelphia



"It's a Gilmer Product—
you can depend on it"
—Happy Van

Gilmer
SUPER-SERVICE
FAN BELT



How a Real Bearing Service Cheated the Railroad

"WHAT'S that? Don't call up the railroad! Do you mean you'll have me out of here tomorrow night in time to make that appointment in Des Moines by Wednesday?"

"Just that! We'll have your bus rolling by five o'clock. These 'Milwaukee' distributors never failed us yet. They'll have a new set of Milwaukee Bearings out here tomorrow in the first mail. 'Tisn't the first time we've cheated the railroad out of a fare!"

* * * *

Jerry and Walt scraped 'em in and a mighty surprised and pleased customer pulled away the next day.

That's what comes of having real nation-wide service—not over a day away!

You not only get Milwaukee Bearings when and where you want them—but when you get them, *they're right*. And how they stand up!

MILWAUKEE DIE CASTING CO., Milwaukee, Wis.



Milwaukee Bearing service is as broad as the nation. Wherever you are — there's a stock of Milwaukee Bearings at hand. Our handy booklet listing cars, trucks and tractors, and giving bearing stock numbers for each, makes it easy to order. Write for your copy today.

MILWAUKEE BEARINGS



MONOGRAM

The
ORIGINAL
Self Locking Radiator Cap

*The
Sellengine*

**You Can't Do *All*
the Selling**

**—So We Do the First
Two-Thirds for You**

The pedestal holding a Monogram cap up in your window makes them come inside to look it over.

The Sellengine on your counter puts the Monogram Cap right in their hands, and dazzles them with an array of shields in handsome brass and brilliant enamel.

By the time both have got in their work, there's barely a third of the selling for you to do; and that little bit pays by a quick turn-over and good profit.

Ask your Monogram Distributor today for a pedestal and a Sellengine.



The Pedestal



GENERAL AUTOMOTIVE CORPORATION
600 West Jackson Boulevard
Chicago, Illinois



pronounced
WICK-A-CO



—with the Wandering Oil Groove.

Number 1354287—U. S. Patent Office—covers the Wandering Oil Groove. And means controlled oil distribution within the cylinder wall.

The immediate and invaluable function of the Wandering Oil Groove is to subdue friction. This it accomplishes by carrying oil to heretofore un-reached high points on the cylinder wall.

*The preservation of the ring
 is of five-fold importance.*

It halts the appearance of the usual friction created crevices. It checks compression leakage. It starves carbon. It enables the oil scraping edge to return all excess oil to the crankcase. It definitely postpones ring failure.

* * * * *

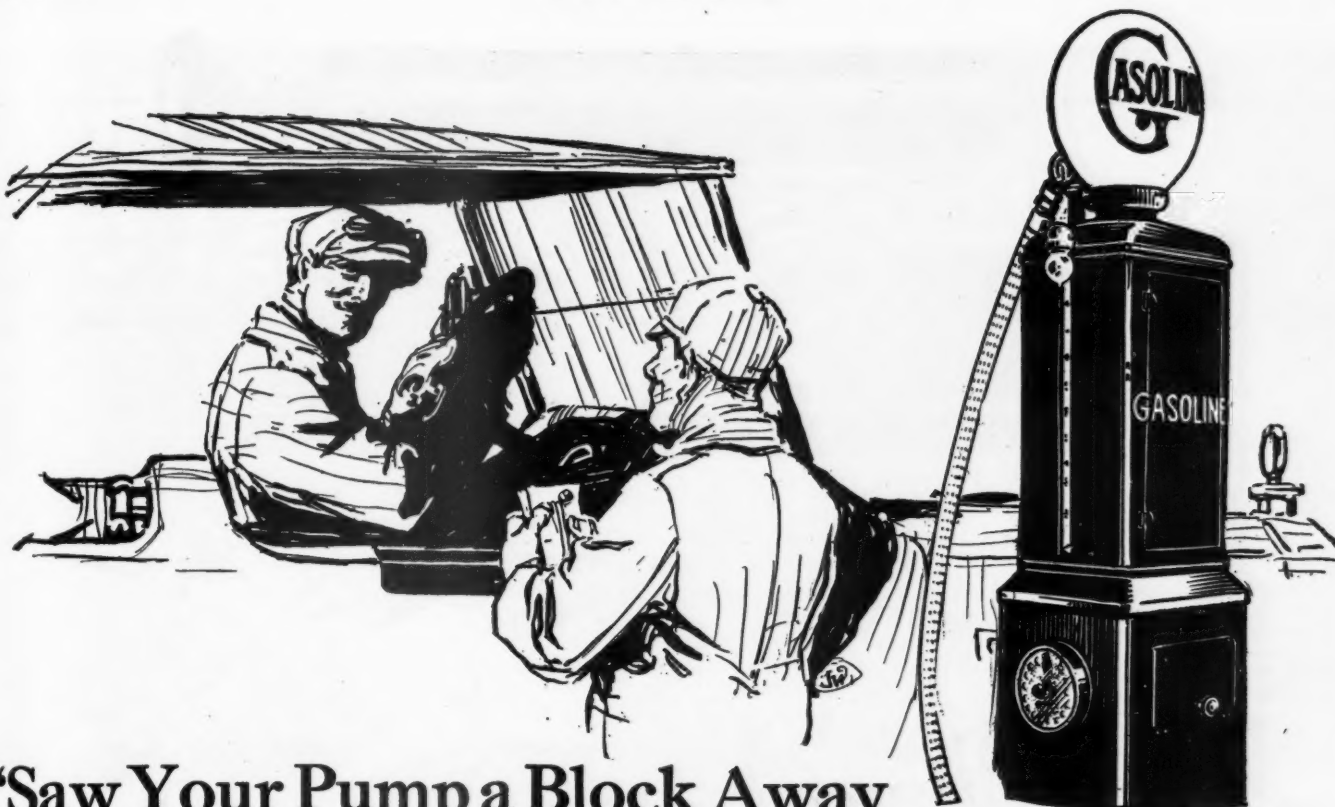
Four other features of design—the Twin Cut—the individual cast—the concentric shape—and one piece construction—make for maximum piston ring efficiency.

* * * * *

Get the complete story of the Wandering Oil Groove from our descriptive data.

Also learn about our special Jobbers' Zone Distribution Plan. It will interest you. So will the discounts.

WICACO SCREW & MACHINE WORKS, Inc.
 4801 Stenton Avenue Philadelphia, Pa.



"Saw Your Pump a Block Away —Knew You Had My Kind of Gas"

Things you should know About Gilbert & Barker Pumps

1. Gilbert & Barker pumps are made by one of the largest manufacturers of measuring pumps in the world.
2. Their positive piston stroke principle of operation has been proved by years of service to be the safest, quickest and most accurate method of measurement.
3. Engineering skill has simplified construction to the fewest possible parts. There is no intricate or delicate mechanism to get out of order.
4. The operating mechanism of the pump is completely enclosed and protected from dirt, dust, and bad weather.
5. The quick return of the piston, which is automatic and doesn't have to be cranked down, saves the time and energy of the operator.
6. The square deal dial and quantity indicator gives visible evidence of accurate measure to your customers.
7. The handsome appearance of G & B pumps and their ample advertising space attracts trade, builds business and increases profits.

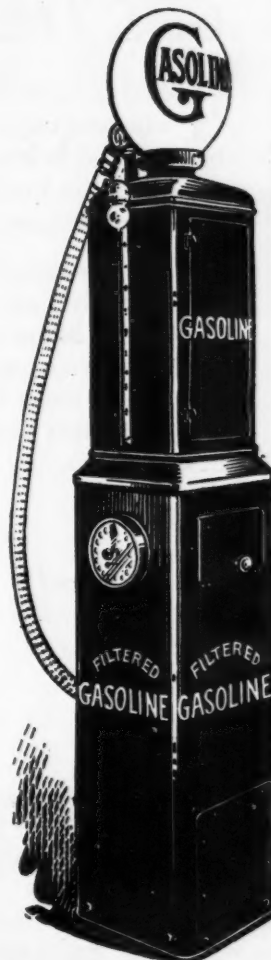
Because Gilbert & Barker pumps are built to **SELL** gasoline as well as dispense it accurately and safely, it will pay you to select this equipment for your gasoline service.

The large space for advertising display can be seen blocks away and their attractive appearance will tempt motorists, who may have passed by before, to stop.

Once at your curb you have the best possible opportunity to "ASK 'EM TO BUY" tires, bumpers, robes, mirrors, tools—anything you know they need.

That's how bigger profits are made.

Ask your oil man today for information and prices on Gilbert & Barker equipment. If he cannot supply it, write us mentioning his name and address.



GILBERT AND BARKER
MANUFACTURING COMPANY
GASOLINE AND OIL STORAGE EQUIPMENT
SPRINGFIELD, MASS.



GET THE TOURIST BATTERY SALES TOO!

THE Tourist is with us. His long day drives are burning up his battery and before he realizes his trouble the plates are buckled in his battery or the old separators are shaken to pieces.

Tourist business is good business because it invariably means new battery sales. There can be no delay in battery repairs. Quick service and a new battery is the rule. Get ready for tourist business and add that extra profit to your battery business of 1923.

LET the Allen-Bradley Test Chart convince the tourist that you are on the square with him. Test his battery with an Allen-Bradley test set and then show him on the test chart the real trouble with his battery. You will be surprised how easily battery sales are made when you have the combination of this high-grade test set and the battery test chart.

Order your Allen-Bradley test set and chart from your jobber, today. It will pay for itself in a short time.

REMEMBER—The well equipped shop gets the business.

Allen-Bradley Co.
Electric Controlling Apparatus

231 Greenfield Ave.

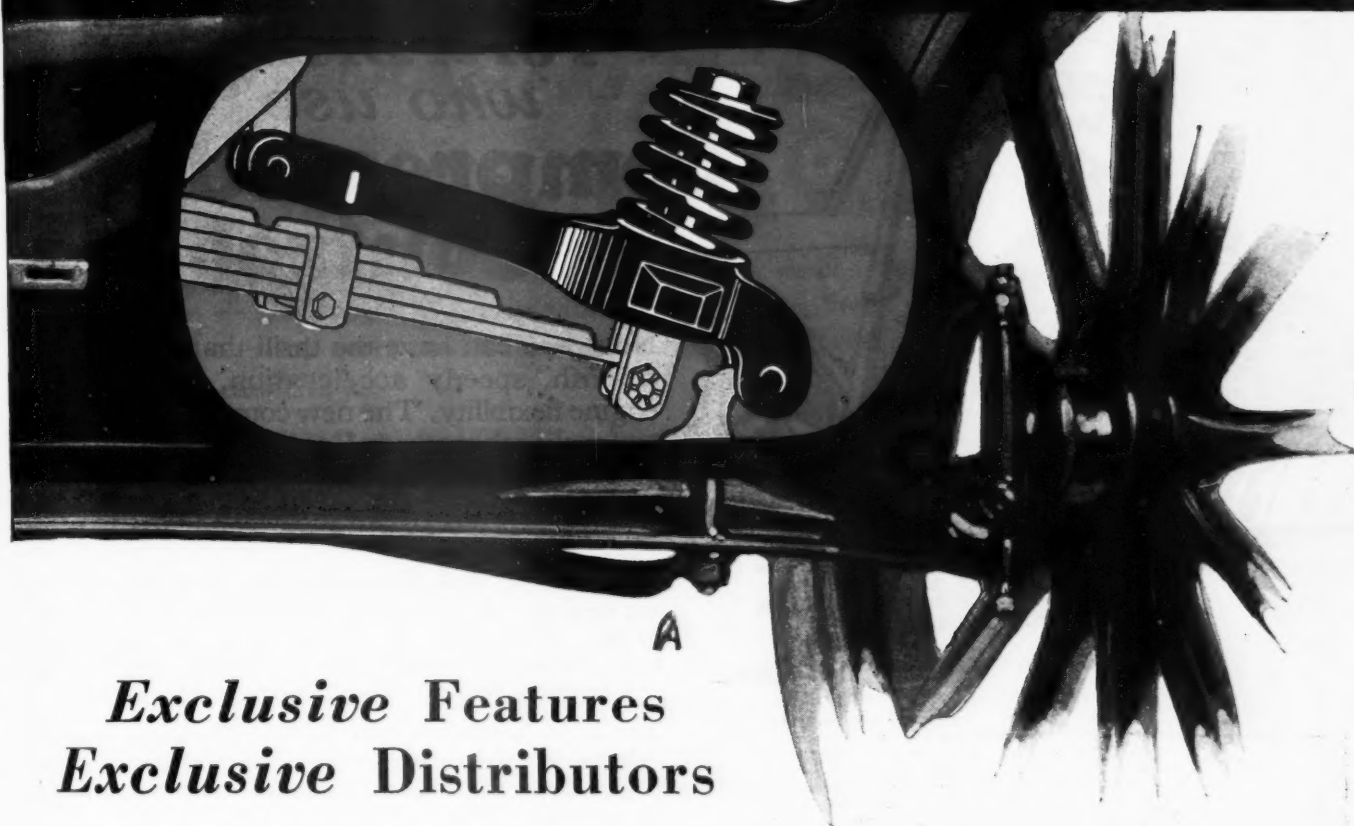
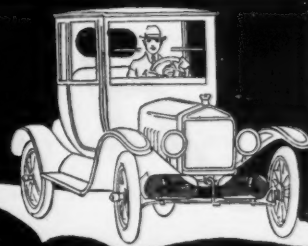
Milwaukee, Wis.

Allen-Bradley

TYPE L-2502
HIGH-RATE DISCHARGE TEST SET



Nothing Clamped to Leaf Spring



Exclusive Features Exclusive Distributors

Here is just one of the five big selling points which are making successful Drednaut distributors—nothing is clamping to the leaf spring to modify its full flexibility—Drednauts simply supplement its action. This feature is sufficiently important for the successful sale of Drednauts. There are four others: ② —Cushions jolts; ③ —Snubs rebound; ④ —Checks side-sway; ⑤ —Adjusts to car weight. We are daily receiving information from successful distributors who have other non-competing lines, also from business men with the vision and capital to successfully represent Drednauts. Territory is becoming more valuable and more difficult to secure. Write us for our liberal proposition today.

AUTO SPECIALTIES MFG. COMPANY, 575 Graves St., St. Joseph, Mich.
Canadian Factory—Windsor, Canada.

DEALERS—With so many points in their favor, Drednauts are fast becoming the leading seller in the Ford accessory field. Write us on your business letterhead for our profitable proposition to dealers.

DREDNAUT

Equalizers FOR FORDS

"CUSHION THE ROAD"

A genuine thrill!

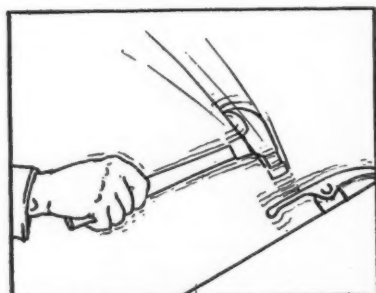
awaits
Ford Drivers
who use
Compressed Air Control.



Now you can have the thrill that comes from smooth, speedy acceleration, and velvety engine flexibility. The new compressed air control makes that sturdy Ford motor operate with wonderful smoothness. Jerky acceleration is impossible. Bumps and ruts can't make you unintentionally "shock" the carburetor open.

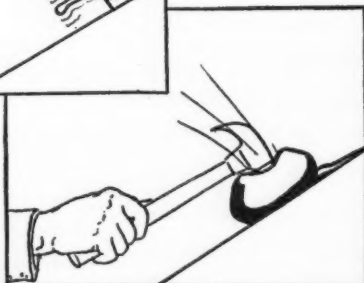
The old metal-to-metal contact has been displaced in the new M. P. C. Pneumatic Accelerator by a *cushion of air*. The gas is fed just as fast as the engine can use it, but no faster—and always smoothly and steadily—something that no other accelerator can assure.

You know how often your motor chokes and "bucks"—because you unintentionally give more gas than the engine can use. This is impossible with compressed air control. There is no rigid metal connection to open the carburetor with a jerk. An elastic column of air, controlled by foot pressure instead of by hand, operates the carburetor. The flexibility of the air literally "cushions" the intaking of the gas.



Suppose you were to hit the ordinary accelerator with a hammer. The rigid, metal connection to your carburetor would "shock" it open, and your engine would either race, or choke and buck. That's what happens when bumps and ruts cause your foot to "jiggle" the accelerator pedal.

But if you struck the pneumatic bulb of the M. P. C. Accelerator, the carburetor would never know it. Because the air by which the pressure is transmitted, "cushions" shocks and jars. It is resilient, and yielding. It gives. Jolting and bouncing can't cause uneven acceleration.



The new M. P. C. Pneumatic requires no extra footrest. The accelerator is itself a footrest, soft and restful. It can be moved at any time, to any position that is most convenient for you. You can install it in five minutes, and it requires no screws and no holes in the floorboards. It is made and guaranteed by the Motor Products Corporation, an old, sound concern of the highest repute. It is warmly praised by every driver who has used it. And it costs only \$3.00—the price of an ordinary accelerator with none of the M. P. C.'s advantages. Your dealer knows about the wonderful new M. P. C. Pneumatic. Ask him!

Dealers!

Here is a really new Ford improvement that "Rings the bell." It is well advertised, attractive displays are supplied, and the product itself is a genuine winner. Write for details.

Motor Products Corporation
11805 Mack Ave., Detroit (18)

M.P.C.

Pneumatic ACCELERATOR

New Departure Ball Bearings

Answer the Writing on the Wall

FAR-SIGHTED men discern the rising demand of the driving public for longer life in its motor cars. The millions that cannot afford a new car every two or three years must make their present or prospective cars last.

New Departures fulfill these more rigid requirements in two ways—by being in themselves longer-lived; and by that ability, making the vital moving parts they support function properly for a longer period.

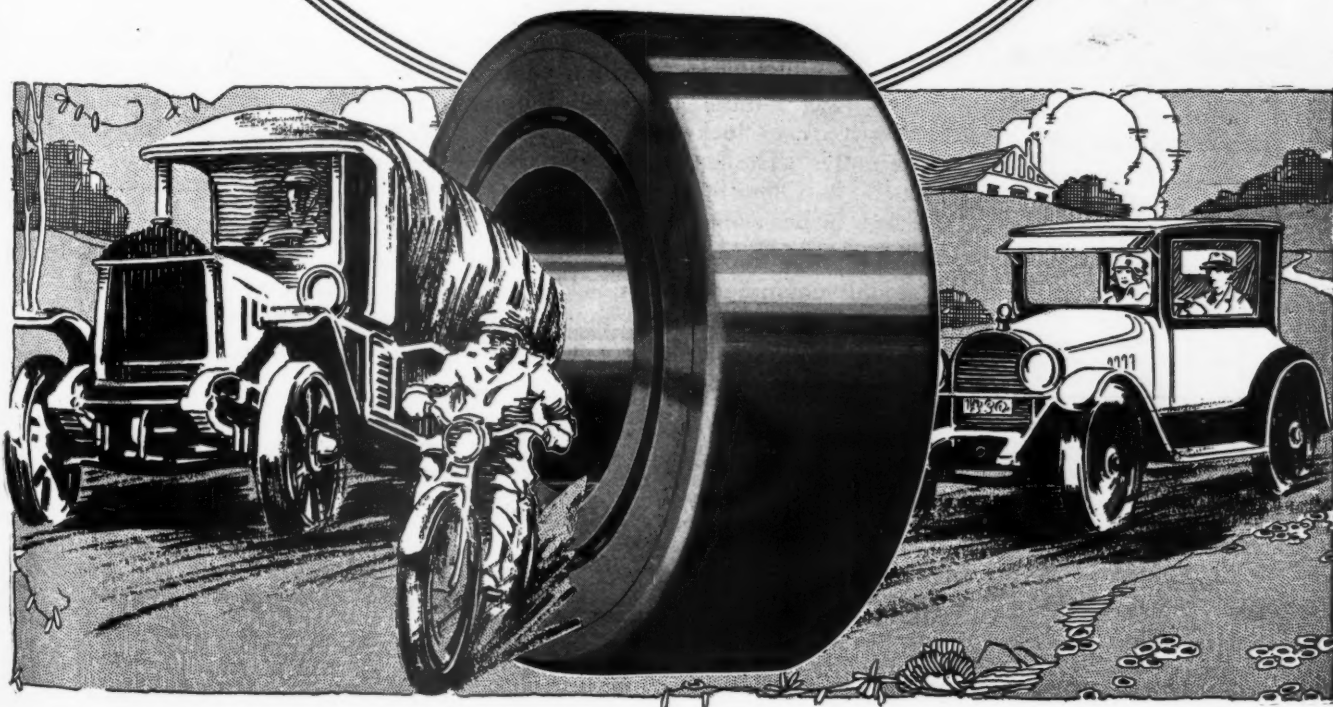
The finest of high carbon chrome alloy steels, correct design, and exquisite accuracy of each part and its interfitment give New Departure their rugged stamina. Their friction-eliminating qualities dispose of wear and consequent need for adjustability, which in turn accounts for the permanent alignment of shafts and correct setting of gears—adding so materially to the life of many important moving parts.

THE NEW DEPARTURE MANUFACTURING COMPANY

Bristol, Conn.

Detroit

Chicago

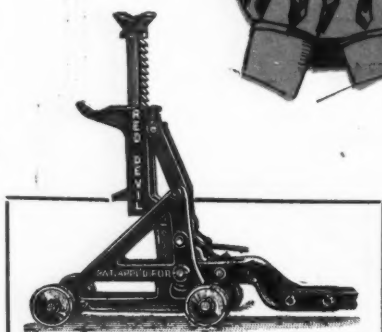




**6 Quick Strokes
Lift the Car 7 Inches**

Red Devil

**Quick Lift
Tire Changing Jack**



Specifications

Wheel Base	12 inches
Tread	6 inches
Length of Handle	48 inches
Over All Length	63 inches
Rack Bar Extension	5 3/4 inches
Equipped with compensating swivel cap	
Lifting Toe	7 1/2 inches from floor
Over All Height	20 3/4 inches
Weight	36 lbs.
Lifting capacity	1500 lbs.

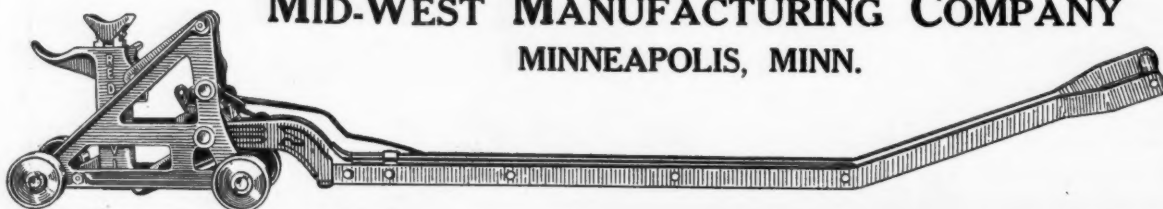
This service jack was designed to meet the everyday needs of the busy garage, service station and tire shop. It is a highly efficient piece of equipment for use when changing tires, removing springs, adjusting brakes and other general uses.

This jack will go under the lowest axle when the tires are flat. Six strokes will lift the car high enough so an inflated tire can be put on. The long handle clears all bumpers, spare tires and gasoline tanks. Positive cam locked pawls make it impossible to drop the load accidentally. The handle is 48 inches long and the jack is on wheels so it can be rolled into position ready for use. The low broad wheel base—13x6 inches—makes it impossible for the jack to topple over.

The garage that appreciates the value of highly efficient, time and labor saving equipment will quickly see the advantages of this jack. It is undoubtedly one of the most convenient jacks ever built and a worthy addition to the Red Devil line of automotive equipment.

Handled by leading jobbers.

MID-WEST MANUFACTURING COMPANY
MINNEAPOLIS, MINN.



**The Best-Equipped Shop
Gets the Business**

Member S. B. A.

**American
Hammered
Piston**

Maximum
Power
Minimum
Waste

A nationally known ring—

The same consistent quality which is hammered into every American Hammered Piston Ring is hammered into American Hammered advertising—and has been for years.

Sales missionary work, sales promotion work, newspaper write-ups, folders, counter cards, lantern slides, sales producing consumer letters, window displays, size charts, window signs, attractive and colorful containers and many other items have made the sales of American Hammered Piston Rings what they are.

There is a ready sale for American Hammered Piston Rings—repeat orders prove it. Ask your Service Station or Jobber to tell you about the American Hammered proposition—and what goes with it.

American Hammered Piston Rings

AMERICAN HAMMERED PISTON RING
COMPANY
Baltimore, Maryland
Export Department
461 Eighth Avenue, New York, U. S. A.

Look
for the
BALL POINT
HAMMER
MARKS
inside the
ring

MAKE GASOLINE GO FURT

Protect the engine of your motor by an efficient quality of maintenance without which a fine body and finish are impossible to obtain.

Look for the Ball Point Hammer Marks

Here's The Ring I Put In My Own Car

How do you stop oil-pumping

When the fireman's hose leaks—

Each Ring Seals
against
leakage
12 Rings

Before Hammering—And After

What
is the source
of your
motor troubles?

A False Bottom in Your Gas Tank?

Look for the Ball Point Hammer Marks

American
Hammered
Piston Rings

Hammered
Piston

Each Ring Seals
against
leakage
12 Rings



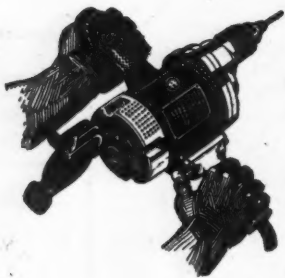
UNITED STATES Portable Electric DRILLS

Jacobs Chuck
Standard
Equipment



The Good Mechanic Knows!

What Are You Paying for Holes?



SOME holes cost more to make than others—depending on how you make them.

A hole produced in U. S. fashion is by far the cheapest for many reasons. With a U. S. Portable Electric Drill you get speed

and power that no drill has ever before possessed—together with lightness and perfect balance that enable you to run it all day without fatigue.

This new Garage Drill has been twenty years in developing, which accounts for its many obvious advantages. All bearings are ball type, and cooling is by air circulation, so the drill does not run hot.

Note the combination handle and breast plate—saves changing of parts. And for quick and easy control nothing has yet been devised to match the new U. S. switch for convenience. It's right under the finger, and a touch starts or stops the motor. Has universal windings, so you can plug it to any lamp socket, whether D. C. or A. C.

Ask for details for Type CUD—the new half-inch drill for garage use.

**The UNITED STATES
ELECTRICAL TOOL CO.
CINCINNATI, OHIO.**

District Sales Offices and Service Stations

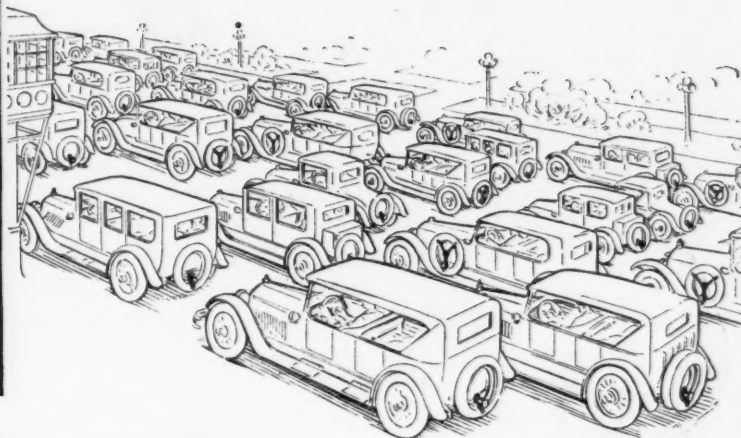
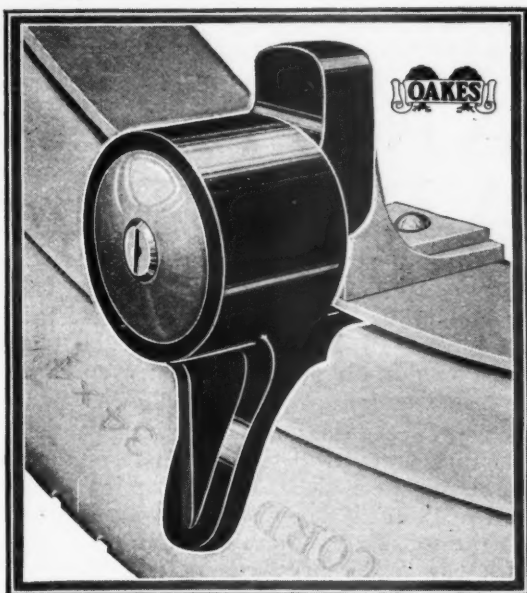
Boston
Chicago
Cleveland
Columbus
Detroit

Houston
Kansas City, Mo.
Milwaukee
Minneapolis

New York
Philadelphia
Pittsburgh
St. Louis

Complete stocks carried in all service stations





More than 2 million tire locks needed this year

Make an Easy, Extra Profit on Every Car or Spare Tire You Sell

EVERY motorist who buys a new car or spare tire realizes his need for protection against tire thieves and he wants a dependable lock—not a mere “makeshift”.

Show him an Oakes Spare Tire Lock and he'll buy it. It combines positive protection with distinctive appearance. Does more than prevent tire theft—adds neatness and refinement to his car, and costs little more than an ugly cable, flimsy padlock or rattling chain.

This lock is easy to install; it simply replaces the regular rim wedge on the tire carrier. Has an unbreakable metal housing, and high grade lock unit. Finished in glossy black with nickel-plated face. Does not rattle or chafe tire or cover. Lasts for years. Thousands in use. Standard equipment on 15 makes of cars. Backed by 13 years' experience. Sells at \$5.00 (Ford type \$4.00). Liberal discounts. Write or wire our nearest distributor or factory for trade prices. This lock is a real money-maker—act TODAY.

THE OAKES COMPANY, ^{Est. 1910} Indianapolis, U.S.A.

Distributors for Oakes Locks

BALTIMORE—Gatch Supply Company, Inc.
 BOSTON—Hartford Shock Absorber Agency, 319 Columbus Ave.
 BUFFALO—D & W Sales Company, 1471 Main Street.
 CHICAGO—Auto Specialties Company, 23rd and Indiana Ave.
 DETROIT—Rex Sales Company, 320 Piquette Avenue.
 LOS ANGELES—Charles L. Mead Company, 1313 Figueroa St.
 NEWARK—Hartford Auto Products Company, 177 Central Ave.
 NEW YORK—Hartford Shock Absorber Agency, 106 W. 63rd St.
 PHILADELPHIA—F. C. Hornbeck, 309 N. 15th Street.
 PITTSBURGH—Axwell Equipment Co., 240 Second Street.
 RENO, NEV.—M. R. Sloan, P. O. Box 471
 ROCHESTER—D & W. Sales Company, 261 Central Avenue
 SEATTLE—Miller-Lowe Tire Company, 1122 Pine Street.



Above: Oakes Wheel Lock for center stud.

Right: Lock for off-center stud.

OAKES Spare Wheel Locks

You can sell an Oakes Spare Wheel Lock on every car with a spare disc or wire wheel. It baffles thieves and beautifies the car. Standard equipment on several fine cars. Types to fit either center or off-center locking studs. List price \$5.00 and \$7.50. Get a sample lock and trade discounts.

OAKES Spare Tire LOCK

This is one of a series of ads, each featuring one member of the Inland Complete Piston Service Line.

A New Process A Better Ring

By a wonderful new process, the Inland Products Co. is producing in the low priced, STEP-SET PISTON RING, an even tension which is not obtainable in many rings costing much more.

This process does not remove a particle of necessary metal—nor is the inside of the ring hammered, peened or knurled at intermittent points. Instead, a **continuous swaging process** sets the tension evenly **all around**—and sets it for keeps. The pressure against the piston walls is right for maintaining a perfect seal without undue friction.

You will doubly please your customers by installing Inland Step-Set Rings: First, by giving them a thoroughly satisfactory job—Second, by giving them that good job at a thoroughly satisfactory price.

The Inland Complete Piston Service Line

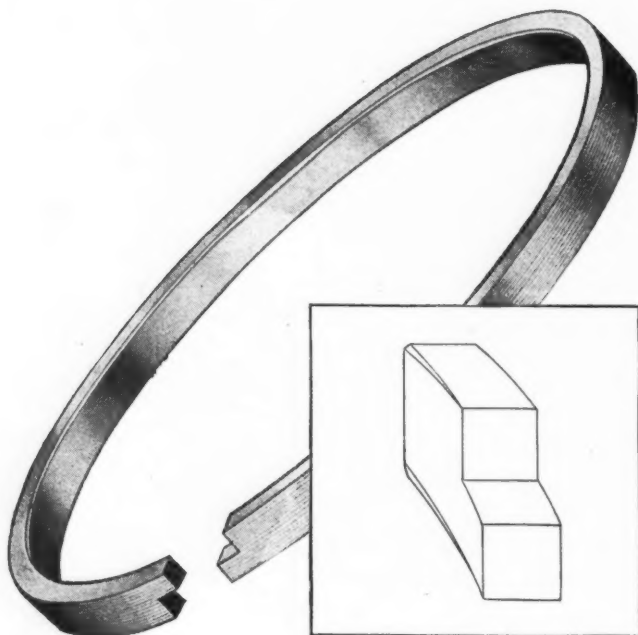
Regrinders—Reborers—Repairmen—Consider the advantage of getting replacement Pistons, Rings and Pins **all from the same source**—all accurately fitting each other. Talk to an Inland Jobber. If you don't know his name, ask us.

Our new booklet, "The Story With a Ring To It," tells all about the complete line of Inland Products. Write for it.

INLAND PRODUCTS COMPANY, INC.

Stocks in Principal Cities

Main Office and Factory: St. Louis, U. S. A.



Inland Step-Set Piston Ring

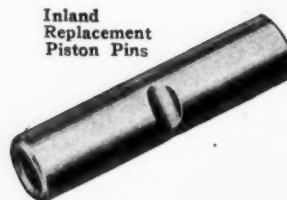
TRADE MARK
REG. U.S. PAT. OFF.
AND
FOREIGN COUNTRIES



Inland
Spiral Cut
Piston Rings



Inland
Oilless
Piston Rings



Inland
Replacement
Piston Pins

Inland
Replacement
Pistons



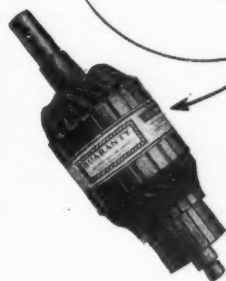
G-171

INLAND

for distributors—

Look for the Yellow Band

Every armature rewound by us carries this band on which is printed our positive guarantee that the armature will give the same service as a new one.



Dealers and Repairmen

Send your defective armatures to our nearest distributor or direct to us. Rewound ones absolutely guaranteed will be shipped from our exchange stock the same day the defective armatures are received. See prices below.

ALTHOUGH our distributor plan was announced only a few months ago we now have over one hundred distributors who are finding armature service a mighty profitable proposition. These distributors carry stocks of rewound armatures and serve the trade in their respective territories with immediate exchange service. The defective armatures taken in are sent to us to be rewound and when returned are put back into stock.

We authorize our distributors to issue with every rewound armature a positive guarantee that it will give the same service as a new armature. The discounts we allow a distributor enable him to sell armature service at the same prices we advertise nationally.

The investment required is surprisingly small and is always represented by standard merchandise which can be liquidated easily. Under this plan there should be a complete turnover of capital several times a year. This means a healthy margin of profit.

As to the market for armature service, we might mention that our output has practically doubled during the last year. Armature service is not only a sound, permanent business but also a growing one.

We shall be glad to send complete details of our franchise to men and concerns qualified to act as our territorial distributors.

U. S. AUTO SUPPLY CO.

ARMATURE SERVICE DIVISION

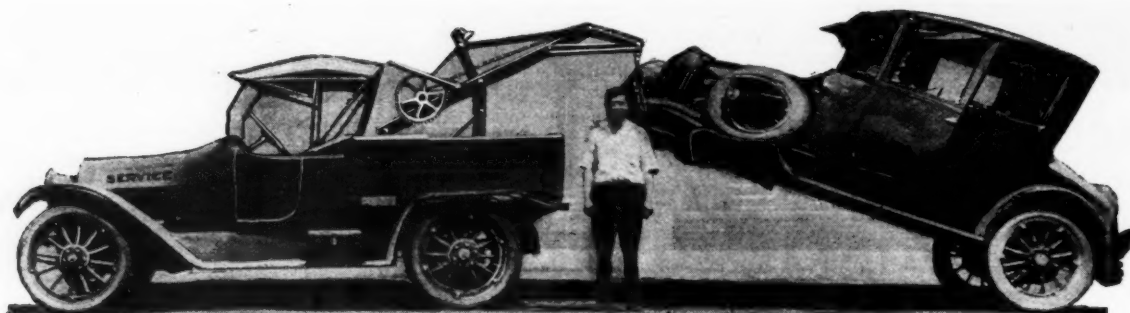
3845 S. Wabash Ave.

Chicago



PRICES

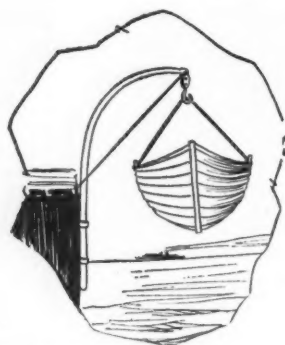
Ford Armature rewound—Any two unit generator armature rewound—
\$2.00 \$5.00



To get the most profit out of a crane—it should have all of these features



—trussed for strength like a bridge.



Removable top extension for clearance like a ship's davit.



—easily converted into a portable floor crane for use in the shop.

Manley features are exclusive and patented—and this gives to the 5000 Service Stations and Garages who use the Manley Crane a decided advantage from a profit building standpoint.

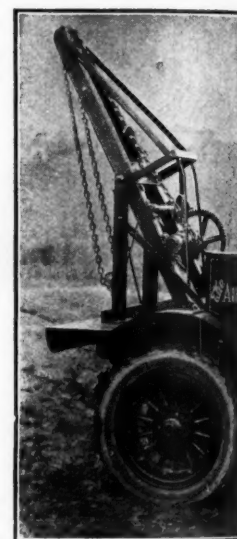
The tilting beam is double trussed for rigidity, its strength is therefore the same in any position—removable top extension—self contained saddle construction, will not buckle frame of car. Hoist attached directly to beam, takes up 50% less space on car. The four leverages—and many other advantages—make the Manley 2 Ton Crane stand out in bold relief as infinitely superior to any other.

One man handles the job with a Manley Crane in less time and at less cost to you.

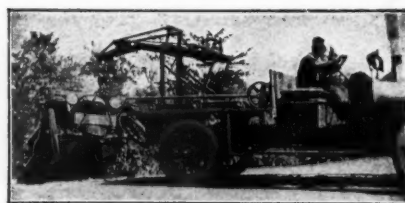
Send for the Manley complete Catalog—a book full of money saving and money making suggestions. Drop us a postal today.

MANLEY MANUFACTURING CO.

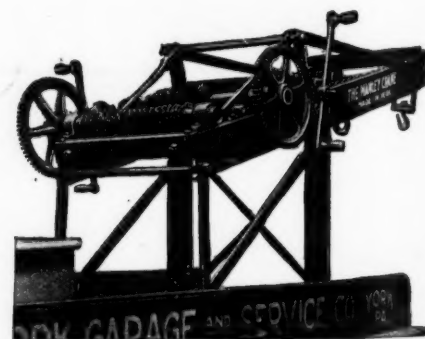
York, Pa.



Beam in vertical position with top extension removed.



By tilting the beam to any angle, every wreck may be handled to advantage.



Manley 5-Ton Crane for Heavy Duty

The two independently operating chain hoists are plainly shown. The tremendous leverage is obtained by using eight chains to lift the load. This gives a big safety margin. Also provision is made to use the Crane with a single chain in the middle for the lighter jobs.

Any Shop with

Manley

Garage Equipment

MADE IN YORK PA.

is the "best equipped Shop."
It gets the business.

for Economical Transportation

The Invincible Couple

Low price and high quality make an unbeatable combination in any line of business.

Everybody wants quality, but ordinarily few get it because it is usually high-priced.

Quality coupled with a price every possible buyer can well afford to pay, wins first place every time.

Chevrolet not only offers

quality at a LOW price—our prices are actually the lowest in the end because Chevrolet is ALL THERE AS SOLD.

The great 80% market, buying low-priced cars, is turning to Chevrolet so rapidly as to astonish the automobile world. In less than a year, we have advanced from seventh to second place in sales.

It pays to go with the tide.

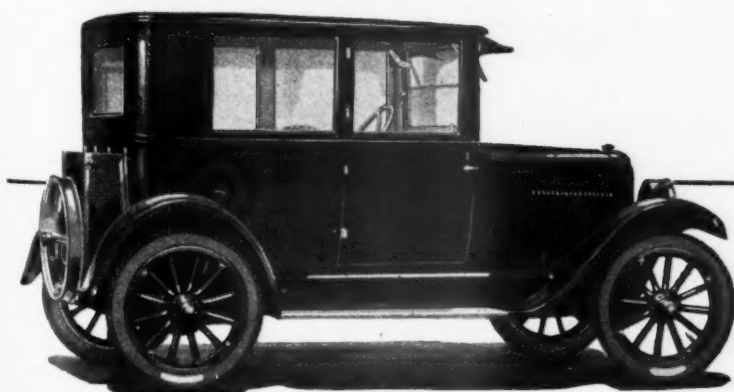
Chevrolet Motor Company

Division of General Motors Corporation

Detroit, Michigan

Dealers and Service Stations Everywhere

Applications will be considered from high-grade dealers only, for territory not adequately covered.



4 Passenger Sedanette \$850 f. o. b. Flint, Michigan

All Prices f. o. b. Flint, Mich.

SUPERIOR Two Passenger Roadster . . .	\$510
SUPERIOR Five Passenger Touring . . .	525
SUPERIOR Two Passenger Utility Coupe . . .	680
SUPERIOR Four Passenger Sedanette . . .	850
SUPERIOR Five Passenger Sedan . . .	860
SUPERIOR Commercial Chassis . . .	425
SUPERIOR Light Delivery . . .	510
Utility Express Truck Chassis . . .	575



Build a Better Business With These Better Bearings

R. I. V. ball-bearings enable a good mechanic to do a better job.

That better job means more cash in the till—and a splendid advertisement for the quality of service you give your patrons.

That sort of advertisement is the surest way to keep 'em coming—because nothing else that you can do will make such a hit with a customer as to give him a well-done, trouble-free repair job.

The high quality of R. I. V. ball-bearings costs you no more than an inferior product.

And you can have that high quality exactly when you want it. The constantly growing list of R. I. V. distributors, centrally located at the big distribution points makes possible a swift, accurate and courteous service of supply—no matter what the quantity or the type of ball-bearing you require.



1755 Broadway,
New York City

SHOW THEM WHAT TO BUY



Packed in attractive display

A handsome two-color box contains 10 Ohio Radiator Caps—A SURE SALES STIMULATOR.

FORD - STAR - CHEVROLET

Retail Prices

50c and 75c

QUALITY is so apparent in Ohio Radiator Caps, that it takes but one look to convince the motor car owner that he needs one.



BAR TYPE FOR ALL CARS

Made in aluminum or bronze nickel-plated. For durability, strength and service it has no equal—not a die cast job, but has machine cut threads that fit the car accurately.



DIAMOND TYPE

This type of cap was designed for those car owners that desire just a little more snap—it's a real seller.

THE OHIO PARTS CO.

Subsidiary to

The Ohio Pattern Works & Foundry Co.

3307 Colerain Ave.

Cincinnati, O.

If You see **(P)** They Are **(K)**

O-P

O-K

The Fisk Flat-Tread Cord

The Super Tire That Commands the Big-Profit Trade

Dealers will find in the Fisk Flat-Tread Cord another success as individual as the Red-Top. It is a super tire with remarkable selling points, proved in more than a million miles of service before the Flat-Tread was advertised to the public.

The big, deep-cut tread gives a surprising ease of riding, even on the heaviest cars, because its 35 per cent extra road contact gives greater and surer traction under all circumstances, without the ply distortion and sidewall strains big closed cars impose on tires of usual construction.

Extra heavy and super strong, it is a positive assurance against skidding, and has created service records almost unbelievable when measured by experience with standard-built cords.

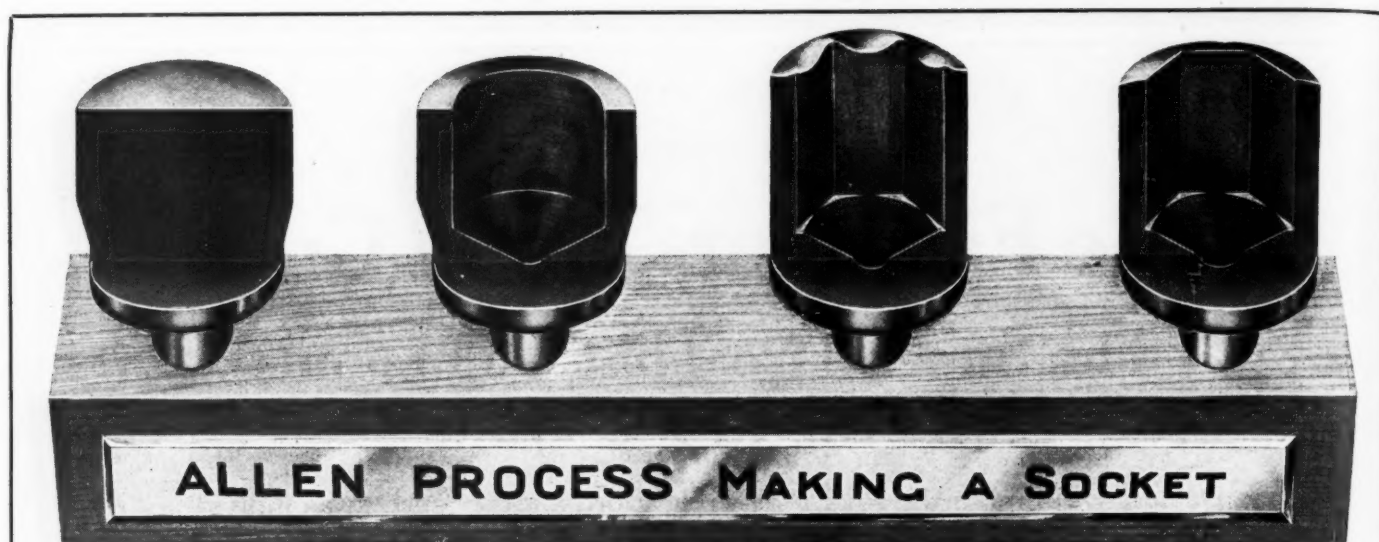
It is trouble-free. If sufficient air could possibly be pumped into a Fisk Flat-Tread, the steel rim would flatten long before this remarkable tire approached its bursting point. It will prove up in the hardest service, and once introduced, you will have a tire which will sell itself to the high-class trade.

Ask our nearest branch about the Fisk Flat-Tread Cord

There's a Fisk Tire of extra value for every car, truck or speed wagon

THE FISK TIRE COMPANY, Inc.
Chicopee Falls, Mass.





More for the tools you get your living by, than for those that "get by" with the car owner. More for service on hundreds of cars, than for the care of one car. ALLEN (Bay State) Wrenches with the cold-drawn sockets are for **your use** first, as a professional mechanic. Maybe later you'll want to **sell "ALLENS"**—but let that wait till you try them.

The Bay State booklet tells all about the process pictured above, and shows sets that take the place of as many as 129 single wrenches! Sent gladly if you'll ask.

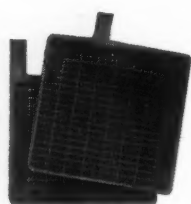
THE ALLEN MFG. COMPANY 135 Sheldon Street
HARTFORD, CONN.

Pacific Coast Branch Office: The Charles A. Dowd Sales Co., 320 Market Street, San Francisco, Cal.

Chicago Distributor: J. V. McDowell, 6230 Ellis Avenue.

Southern Distributors: The Johnson Sales Co., 1429 Candler Bldg., Atlanta, Ga.

BATTERY PLATES 100% Active



The oxides that go into GENERAL plates are *ground* by a pulverizer that makes every grain ready to respond when in the battery. They are not just *mixed* together. There are no hidden lumps of inactive material. Because every part is 100% active, GENERAL plates have a high capacity that satisfies your hardest customer.

Your Guarantee Will Stand Up

OUR 90-DAY PLAN

Our 90-day plan enables you to buy plates *as you need them* at quantity prices without loading your shelves with stock. Ask about it.

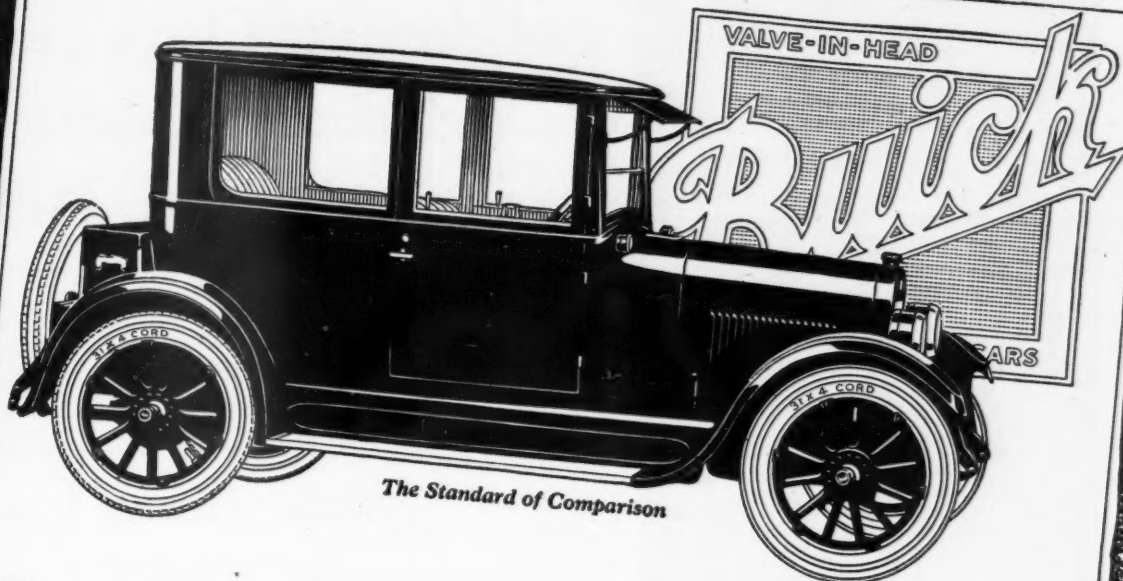
GENERAL plates last longer than ordinary plates because every portion of the plate takes up its share of the strain. That is why your repair jobs *will run long past your guarantee* when you use GENERAL plates.

Our folder "A Shop Talk on Battery Plates" gives some interesting tests that may be new to you. It is yours for the asking.

General Storage Battery Co.

2005 Locust Street,
St. Louis, Mo.

THE ILLUSTRATED BUFFALO EXPRESS,



The Standard of Comparison

For Cross Country or City Driving

From the handsome luggage trunk on the rear to the nicked drum head lamps the Buick four cylinder touring sedan has an air of smartness that is distinctly new in a motor car of its price.

This model combines the rich luxury of the fine closed car with practical every day utility for business and social motoring. Touring is made comfortable by the luggage facilities the trunk provides and by the broad vision afforded by the wide windows.

Fours		Sixes	
2 Pass. Road.	\$ 865	2 Pass. Road.	\$1175
5 Pass. Tour.	885	5 Pass. Tour.	1195
3 Pass. Coupe	1175	5 Pass. Tour.	
5 Pass. Sedan	1395	Sedan	
5 Pass.		5 Pass.	

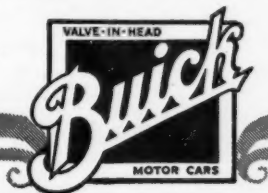
Fitte

Selling Buicks is a Permanent Business

Many Buick dealers have been selling Buicks for more than ten years. This permanency is due to the unvarying popularity of Buick and to the way in which Buick helps its dealers to a profitable and lasting business. Why not have your name on file?

BUICK MOTOR COMPANY, FLINT, MICHIGAN
Division of General Motors Corporation

Pioneer Builders of
 Valve-in-Head Motor Cars



Branches in All
 Principal Cities



G. & K. complete line of Fan Belting and Clutch Leathers. Well displayed, easy to handle, rapid turnover. Ask your jobber.

The Graton & Knight
Manufacturing Co.

Automotive Division
Worcester, Massachusetts

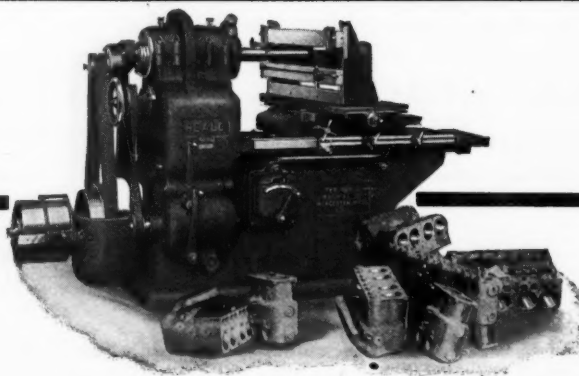
Repairmen and Motor Owners Unanimously for the HEALD

THE REPAIRMEN choose the Heald for its economy in producing the highest grade of work. The Heald Universal Jig permits quick set-ups and accurate location of the cylinder bloc regardless of size or type. Simplicity of control eliminates lost motion and accurately graduated dials supplant guesswork. Every factor for cutting time from floor to floor is incorporated in the design and the minutes saved on every bloc show in dollars in the day's profits.

THE CAR OWNER demands Heald regrinding because of its efficiency and economy. A Heald-ground cylinder is as perfect as mechanical means can make it. 90% of all motor manufacturers finish their cylinders by grinding and use Heald machines exclusively. Naturally the owners will want the same grade of finish when regrinding in order to maintain the high standard of their power plant.

If you are considering this work, visit several regrinding shops, get in touch with the manufacturers themselves, and finally question various motor owners as to what equipment they advise to handle this work so as to bring you ultimate success. Let us send you convincing literature or even give you a personal call. No obligation. Glad to do it.

The Heald
Machine Co.



61 New Bond St.
Worcester, Mass.

The Analysis of Timken Steel is:

Carbon	.15— .20
Manganese	.45— .60
Phosphorus	.04
Sulphur	.04
Silicon	.15— .20
Chromium (Cups & Cones)	.40— .50
Chromium (Rollers)	1.00—1.20

What 1.00% to 1.20% Chromium in Timken Steel Means

Timken laboratory tests, extending over a period of years, have proved that rollers containing a high chromium content have the greatest resistance to wear, and fatigue, and shock that modern knowledge can produce.

That is why the steel used in the rollers of Timken Tapered Roller Bearings contains from 1.00% to 1.20% of chromium. And that is one reason why records of many hundred thousand miles of service are not uncommon for Timken Bearings.

But chemical analysis alone is not the only specification to which Timken steel is made. Timken steel is *electric* steel—clean, thoroughly deoxidized, electric steel made in the steel mill owned and operated by The Timken Roller Bearing Company.*

It is this clean, thoroughly deoxidized, Timken electric steel which makes possible the successful case-carburizing and pack-hardening that gives finished Timken Bearings their glass-hard outer surfaces with tough, elastic, inner cores.

It is this clean, thoroughly deoxidized, high chromium, Timken electric steel which is partly responsible for the enviable reputation of durability held by Timken Bearings in more than 400 American and European makes of motor cars, trucks, and tractors.

The Timken Roller Bearing Company is the only bearing company which makes its own steel and its own seamless tubes, and rods, in its own electric steel mill, rolling mill, tube and rod mill.

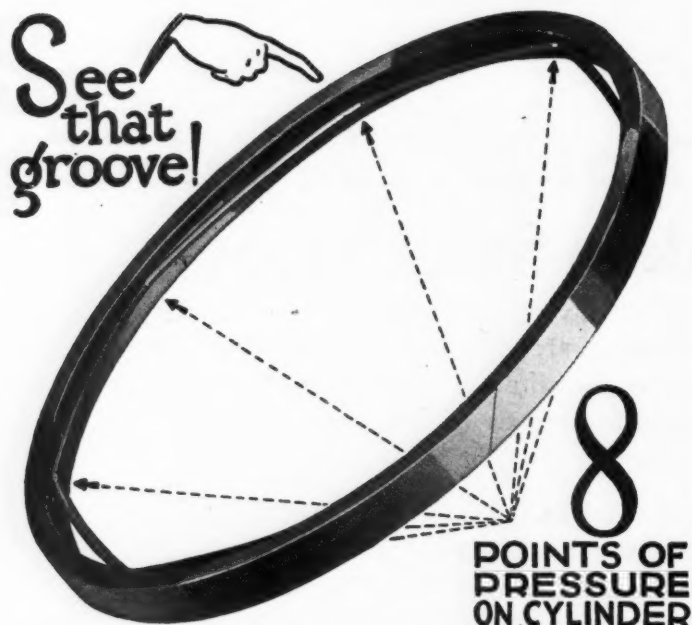
*Send for booklet.
"Timken Steel"

The Timken Roller Bearing Co
CANTON, OHIO

© 1923, By The T R B Co, Canton, O

TIMKEN
Tapered
ROLLER BEARINGS





Frank talks about piston rings

ANYBODY who has been selling motor cars for 14 years, as I have, has heard considerable conversation about the weak points of piston rings. After listening to complaints for ten years, I began to wonder why it was so hard to make a piston ring fit "light tight." I suppose I was a lot like the book agent who didn't know books couldn't be sold—and sold one at every door.

I just took the rings out of a notorious old oil pumper, cut a groove inside the ring and fitted a spring behind the ring that brought equal pressure on eight points around the circle. I ran that old hack 600 miles on four quarts of oil and nary a fouled plug—simple wasn't it?

The present Osborne ring is a long way ahead of that of course; but there is nothing wonderful about it to me. It's a simple idea that does the job—nothing more.

I want every driver in the country to try this better ring and I'm going to send a sample free to every dealer who believes that money can be made selling a ring that he can guarantee and look the customer in the eye while he does it.

Address me personally—I read my own mail.

Frankly,

Frank Osborne



THE OSBORNE
PISTON RING
COMPANY
5005 EUCLID AVE
CLEVELAND

Osborne
EQUI-TENSION Piston Rings

MOTOR TRANSPORT

MOTOR TRANSPORT, formerly *The Commercial Vehicle*, is devoted to the development of the art and science of motor transportation as it applies to the transport of commodities by Motor Truck, the transport of passengers by Motor Bus and the transportation of both by Gasoline Railroad Car.

Addressed to the Fleet Owner and those concerned with the operation of fleets—its mission is to analyze all problems which properly come within its scope—and to assist in the solution of these problems by means of editorial discussion.

The six major problems which the Fleet Operator has to contend with in the handling of his fleet, and which MOTOR TRANSPORT helps to solve are

Cost of Operation

Systems of Operation

Problems of Organization

Handling Drivers

Maintenance

Legislation

Each issue of MOTOR TRANSPORT has articles based upon the factors outlined above and these articles are written from first-hand investigations and study by our editors in the field.

MOTOR TRANSPORT is published semi-monthly, on the 1st and 15th. The subscription price is \$2.00 per year (\$2.50 West of the Mississippi).

Write for a sample copy

MOTOR TRANSPORT

(Published by the Class Journal Co.)

239 West 39th St.

New York, N. Y.



**Quick Sales!
Quick Profits!
Quick Turnover!**

*—Because of this
exclusive advantage*

Look where you will, you'll find no other tire pump with the selling advantage possessed by MONROE Self-Oilers. For no other pump has the patented MONROE Self-Oiling Washer.

Ordinary pumps and even pumps claimed to have self-oiling properties, incorporate no adequate means for keeping the valve leather permanently lubricated. As a result the leather has a tendency to quickly dry out and crack. When occasion arises to use the pump, compression is gone; the air leaks by the valve into the barrel, rendering the pump useless when needed most.

MONROE valve construction successfully overcomes this great drawback. By means of the patented Self-Oiling Washer, the valve leather is constantly kept in a soft, pliable condition. Every stroke of the plunger sends a full barrel of air to the tire.

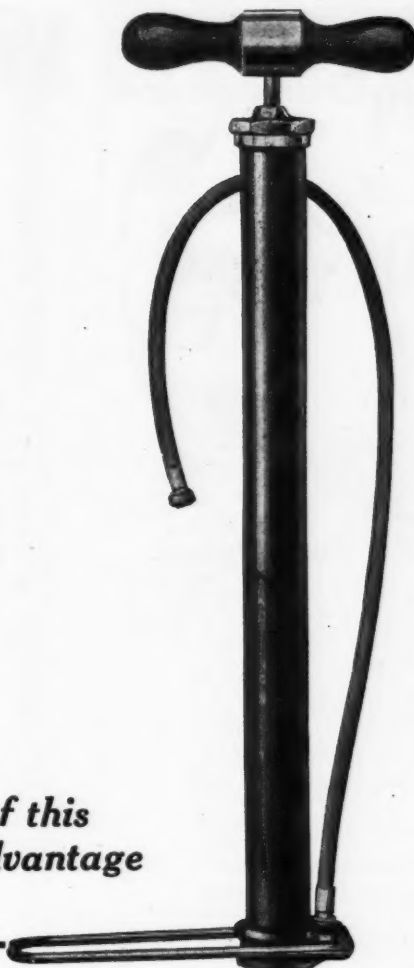
A MONROE Self-Oiler is the practical pump for every motor car. Longer life—unfailing service—fairly priced. A substantial profit with every sale—and no dead stock on your shelves.

If you want to supply your trade with a really *dependable* tire pump at an unusually low price, stock up on MONROE Self-Oilers. Thousands of dealers know how fast they sell—how quick and sure are the profits.

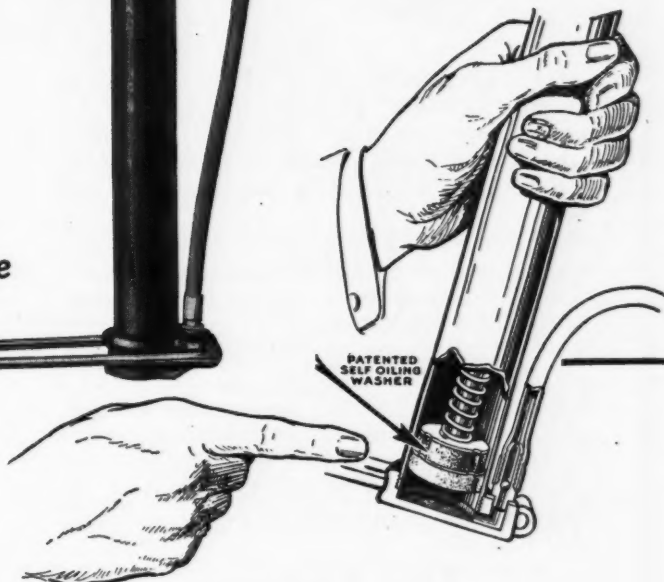
Write for full particulars and prices

MONROE AUTO EQUIPMENT MFG. CO.
MONROE MICHIGAN

Sales Representative to Jobbers Only
The Fulton Company Milwaukee, Wis.

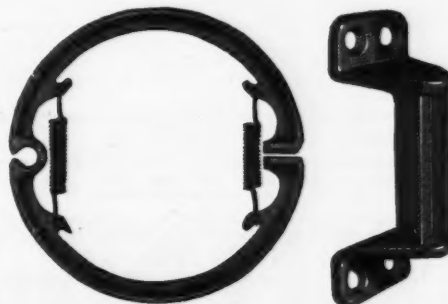


The patented MONROE Self-Oiling Washer is located just above the valve leather. Before the pump is assembled, this washer is thoroughly impregnated with a leather preserving oil. On each up-stroke of the plunger the action of the valve spring compresses the washer and releases a very small amount of oil which is absorbed by the valve leather. The leather is thus kept so soft and pliant that it readily spreads on every down motion of the plunger, completely filling the barrel and assuring maximum compression. This proven principle of construction is an exclusive MONROE feature—no other tire pump has it.



Two More Profit Producers!

Along with your stock of MONROE Self-Oilers, put in a supply of MONROE Spotlight Brackets and MONROE Brake Shoes for Fords. You'll find a ready call for both these splendid articles. Priced low enough to sell quickly, yet net you a neat margin of profit. Write at once for full particulars and prices.



STANDARD EQUIPMENT IN MANY LEADING MOTOR CARS

Turner Junior Timer

\$2.50



Patented
2-15-16
5-23-22

For Ford Motors

The coming of the TURNER JUNIOR TIMER is the most important development in Ford ignition since the invention of the famous TURNER 2 in 1 TIMER.

THE TURNER JUNIOR TIMER, a genuine quality product throughout, is built upon the same practical principle which has already established the TURNER 2 in 1 TIMER as the leader in its field.

The same painstaking care in construction, the same high standard of material selection, characterize this newest development in the TURNER Line.

THE TURNER JUNIOR TIMER will positively do these things for any Ford: Increase power, greatly lessen plug fouling and in many cases stop it entirely; start the motor instantly in all weather; save gasoline; decrease motor "kicking." It is quickly and easily installed and requires NO OILING.

The Famous Turner 2 in 1 Timer

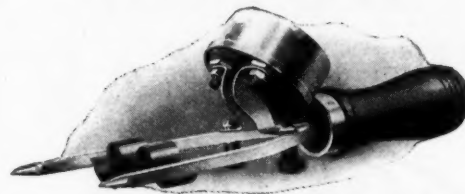
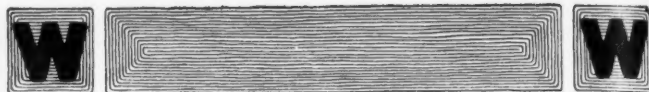
The TURNER 2 in 1 Timer, known to dealers and motorists everywhere, is furnished complete with all enclosed, short-proof wiring assembly. Here are some of the points of quality that you will recognize instantly: Brush Container of special alloy metal; Contact Brush of phosphor bronze; Contact Wire of high grade piano wire; Stop Pin holding brush in place; Flexible Metal Conduit housing all wires; Genuine Bakelite Timing Disc; Aluminum Alloy Shell; Connecting Wires in four lengths; Best quality hardened Brass Contacts; Snug Rubber Nipple; Hub Enclosure for wire protection. Price complete \$3.60.

Write today for further information concerning the famous TURNER TIMERS—the "2 in 1" with the complete wiring assembly and aluminum alloy shell—the "JUNIOR" with the Bakelite shell.

TURNER MFG. CO., DEPT. K. KOKOMO, IND.

Also manufacturers of the Turner All Metal Visor, Foot Accelerator and other high grade motor devices.

TURNER



INSTANT SERVICE

Give your customer an immediate answer when he asks "How are my batteries?" You don't even have to stop the engine—when using the Weston Heavy Discharge Battery Tester—a direct current voltmeter having legible, easily read scale mounted on a substantial prod; nickel finish.

WESTON COMPLETE TESTING EQUIPMENT

- No. 441 "Fault Finder"—for utility use and general testing.
- No. 443 Battery Voltmeter—for taking E. M. F. of individual cells.
- No. 354 Dashboard Ammeter—conceded to be supreme for accuracy and dependability.
- No. 280 Testing Set—for every known electrical test.

If you haven't Weston testing instruments you cannot render the highest standard of service to car owners. Complete information gladly sent upon request. Write today.

Weston Electrical Instrument Company
10 Weston Ave. Newark, N. J.

Branch offices in all principal cities.

WESTON



"THE SUN NEVER
SETS ON THE
WESTON"

"STANDARD" The World Over
**ELECTRICAL
INSTRUMENTS**

An Indicating
Instrument for
Every Individual
Need and Industrial
Purpose

"Quick — Convenient — and Always Ready"

C. Wolfkeil, an old hand of the game, says: "It should be in every auto repair shop in the country. Quick, convenient and always ready. It is a matter of seconds only on large or small jobs, as in auto wiring, it is the most convenient material that I have come across."

Mr. Wolfkeil hit the nail square on the head. We've said the same thing before and as usual we'll prove it. Write us for a sample.



Sold by live dealers everywhere in one pound coils, in cartons, and on one, five and ten pound spools

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Direct Factory Representatives:

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KESTER

Acid Core WIRE SOLDER

(ENLARGED PHANTOM STANDARD SIZE 1/8 INCH DIAMETER)



Requires Only Heat

REASONS ..WHY..

You should sell the
**Heckman
Auto Signal**



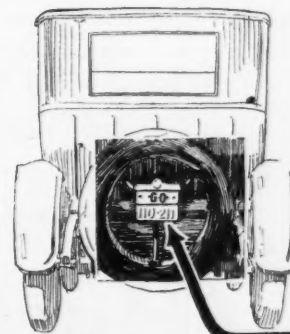
1. It's thoroughly practical;
2. Gets its message across instantly;
3. It warns of a proposed stop automatically whenever the brake is applied;
4. It warns of the direction of a proposed turn 50 feet, 100 feet or 200 feet before the steering wheel is brought into action;
5. Mechanically perfect;
6. Strongly built and fool-proof—nothing to get out of order;
7. Absolutely dependable — tested 1,000,000 times without a miss.
8. Economical—acts as tail light and consumes less current than a dashlight in operation;
9. Uses current only at instant of contact, regardless of length of time signal is displayed;
10. The only signal (as far as we know) in which the entire signal face is used for every warning;
11. One demonstration sells it;
12. Attractive discount to dealers.
13. Backed by our broad guarantee— money returned without question if not perfectly satisfied.

Mail the coupon today for complete descriptive folder and our agency proposition — it costs nothing to investigate. Attractive exclusive territories still open.

THE HECKMAN SIGNAL CO.

117 Bowen St.,

St. Louis, Mo.



Mail This Coupon
RIGHT NOW—

Fold and Tear on This Line

Heckman Signal Co.,
117 Bowen St., St. Louis, Mo.

M.A. 5-3-23

Please send us descriptive literature and details of the Heckman Signal agency proposition.

Firm Name

Street and No.

City State

Effective!



Harmless!

They're At It Now!

THIS is road-oiling time—motorists are looking for something to remove tar and grease from their machines, something effective and harmless. For four years Pontoklene has proved it will do the job without injury to the finest body finish. Retails at \$1.00 a can. Order from your jobber today.

THE PONTOKLENE COMPANY

2604 Main Street
Norristown, Pennsylvania

Business Builders

Huetter Fly-Wheel Gear Bands are regular business builders. A distinctly quality product, made of hard, tough steel, with teeth chamfered to specifications recommended by the manufacturer of the Eclipse Bendix Drive.

With Huetter silent gears, you can turn out repairs that last—the kind car owners invariably look for, the kind that mean better business for you.

Order direct. Our nearest distributor will deliver in a hurry.

Huetter's

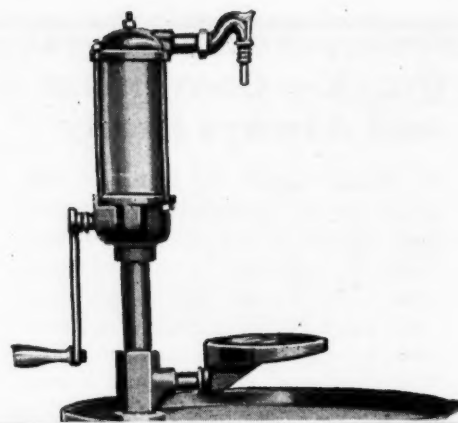
Fly-Wheel Gear Bands

Write for New Catalog List!

Huetter Machine & Tool Co.

538 Kentucky Ave.

Indianapolis



When operating a large garage, I built up one of the largest grease and oil businesses in the State of Michigan. I then turned that large business into a profitable one by perfecting a grease pump that would pump, without waste of grease or time, direct from the barrel into rear axles and gear boxes.

I began making them for the Trade, and if you want to increase your bank deposits and give your customers better service, place a trial order for a Handy Ben Grease Pump and a handy Ben Visible Oil Pump.



My grease pump accurately measures one pound per stroke. My Visible Oil Pump gives one quart per stroke. You will never know how much you have needed both until you have tried them.

Let me help you develop a real grease and oil business. Write today!

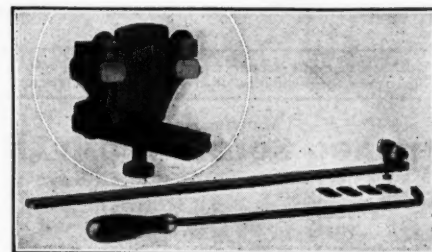
Ben Bennett
PRESIDENT

BENNETT INJECTOR COMPANY

Inventors and Manufacturers of Grease and Oil-Handling Devices
MUSKEGON, MICHIGAN

BIG PROFITS IN REPAIRING SCORED CYLINDERS

No Secret or Mystery with the TORIT Process



TORIT SCORED CYLINDER TOOLS

(Adjustable blade holder magnified)

TORIT tools refinish the cylinder to the same bore and surface. No new pistons, no regrinding. Easy work, big pay. Get your outfit now.

Price of tools, as shown, with instructions \$10.00
Filling-in metal, per pound..... 3.50

ST. PAUL WELDING & MFG. CO.

169 W. Third St., St. Paul, Minn.

Mfgs. TORIT torches, generators, preheaters. Distributors REGO oxy-acetylene equipment.

Meilicke Signals

Check-Lite



**Talk Carefulness
Sell Signals
Make Money**

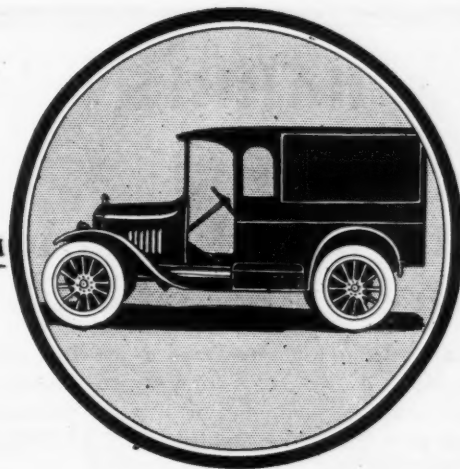
When you sell signals you are selling safety. MEILICKE Signals guarantee safety. Should faulty wiring cause one to fail, due notice is given the driver, and he governs himself accordingly. The guarantee covers any fault of material or workmanship, offering a new signal or money back, should either fail. This guarantee is backed by a long-established reputation for fair dealings.

Check-Stop signal combines a tail-light and a stop-light. The following driver watches the tail-light, and cannot miss the stop signal that glares just above it. Installation is simplicity itself.

A signal system can only be as reliable as its weakest link. That is why we make our own brake switch.

There is good money and good will to be gotten from MEILICKE Signals. A letter to your jobber today starts you getting both.

**MEILICKE CALCULATOR CO.
944 WRIGHTWOOD AVE.
CHICAGO ILLINOIS**



For the Ford Delivery and Truck

THE Ford in commercial use is subjected to hard and continuous service, and it must be on the job all the time. Time spent in the repair shop costs a tremendous amount in the loss of good will and the rendering of poor service to customers.

Put a Ford Faithful Oiling System on your Commercial Fords. It will assume 100% lubrication at all times and without which economical transportation is impossible. A "Ford Faithful" will positively increase the life of the Ford Motor and Transmission 50%. Burnt out bearings, scored cylinders and clogged oil lines, are a thing of the past. No frequent trips to repair shops or continual adjusting of transmission bands.

Try one out now, at our expense,—if it fails to make good we will refund your money at once.

Ford Faithful Oiling System

Complete

\$5.75

Dealers—Many operators of Ford Delivery Fleets, have, after trial, installed "Ford Faithfuls" on all their cars. They really do the work and satisfy. You should carry them in stock. Write factory for complete folder and dealer's proposition.

W. O. Thompson Mfg. Co.

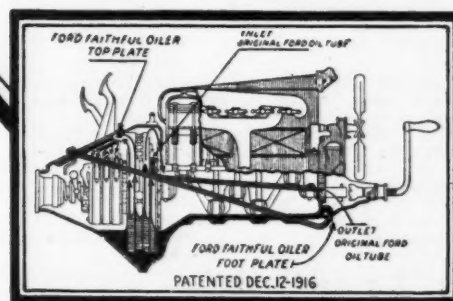
330 Mountain View St.

PASADENA

CALIFORNIA

Ford Faithful patents are being upheld. Infringers will be prosecuted to the full extent of the law.

FORD FAITHFUL OILING SYSTEM



HARRIS OILS AND GREASES

Let your customers have the BEST!

When you sell a customer a product that you **KNOW** will give him utmost satisfaction, you are increasing your most valuable asset as a hardware dealer,—**CUSTOMER GOOD-WILL.**

Harris Oils are always of uniformly high quality. Every auto owner whom you convert to using Harris Oils will come back some day and thank you for what you have done.

*Let us tell you how you can
make money selling Harris Oils*



"America's Leading
Lubricants"

Copyright AWHOCO 1921

A. W. Harris Oil Co.

326 South Water St.
Providence, R. I.

ADPASCO TREATED GASKET PAPER



For Paper Gaskets In Automotive Work

Where gaskets are not exposed to extreme heat, use Adpasco. No longer necessary to use expensive asbestos sheet here. Adpasco is specially treated so it will not rot out and crack like ordinary paper makeshifts. Pliable, soft, holds its shape. Easily cut with knife or hammer head.

Approx. weight 12 oz. Size 36x40 in. Sold by over 400 jobbers. Used daily in thousands of shops.

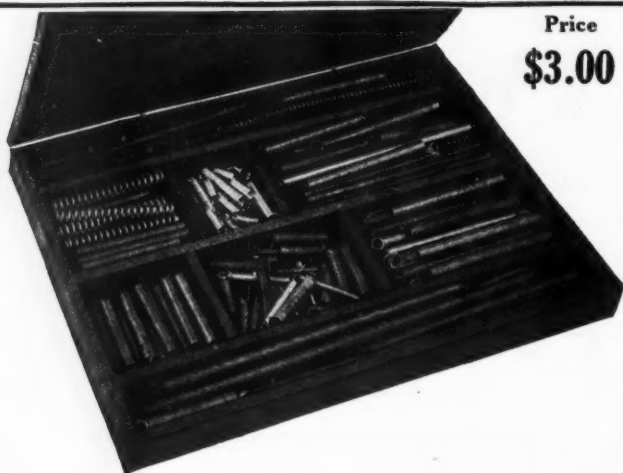
ADVANCE PACKING & SUPPLY CO.

62 East Lake Street

Chicago, Illinois

Pacific Coast Distributor: Allied Industries, Inc.
San Francisco, Los Angeles, Seattle.

Springs For All Purposes



Price
\$3.00

Peck's Assortment of coil springs contains about everything needed in the busy Garage, Service Station and Repair Shop in the shape of springs.

It is also a ready seller over the Accessory counter. The car owner finds it to be just what he wants and needs. Always ready—no stopping to

make—no waiting—just reach into the box and pick out what you want.

Peck's Assortment of Coil Springs comes to you in a well built wooden box, partitioned off into convenient spaces. Handy, efficient, good. Order your box today. Jobbers—write us for prices and discounts.

THE PECK SPRING CO.

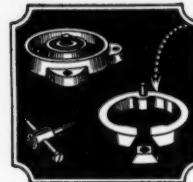
PLAINVILLE

CONN.

PARKER VISES

Have Renewable Jaws
That Cannot Work Loose

Milled to fit and pinned on; not cast or screwed on. Not a mere face jaw, but one that covers the entire top of the vise with steel.



—and Swivels That
"Grip Like a Grizzly"

Not a mere clamping device but a wedge and ring assembly with the strength of solid back jaw. Tightening the wedge expands the ring to a gripping power 360 degrees of the base.

Send for Folder No. 9 showing all the
seven Parker features.

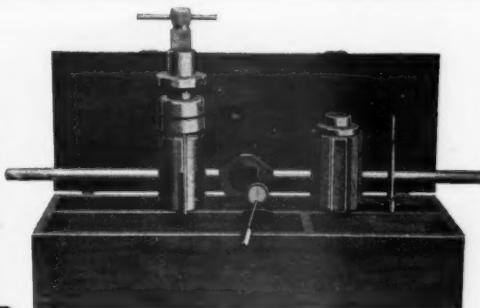
The Charles Parker Co., Master Vise Makers
Meriden, Conn., U. S. A.

PARKER VISES

"Grip Like a Grizzly"



THE MOST PROFIT COMES FROM CYLINDER REAMING AND HONING



This F-J set will at a small cost enable any service man to pull his way, the most profitable part of the servicing to be done on the large number of cars in his own locality.

The F-J Way is the fastest and is practically identical with the factory method.

THE F-J PISTON REAMER

The F-J piston reamer enables the mechanic to fit the wrist pins in about one-third the time required with other reamers and he is assured of alignment because both holes can be reamed at the same time.

Our reamer catalog is ready to send upon request.



The Foster - Johnson Reamer Co.
1144 Beardsley Ave., Elkhart, Ind.

ACCURATELY
DALL
MACHINED

SEMI-STEEL
REPLACEMENT PISTONS

ACCURATELY
DALL
MACHINED



For replacement work after a rebore or re-grind job insures your customer as good if not a better job than the original assembly.

Dall Pistons are simply GOOD Pistons, made to manufacturer's specifications, sometimes more refined in design and lighter in weight, but always as carefully made and inspected as though they had to pass the most rigid inspection of a Motor Manufacturer.

Dall Pistons are regularly furnished in standard and various oversizes, also semi-finished 1/16 oversize.

Write today for price list and delivery schedule on all items. Distributors at various points will take care of your requirements.

THE DALL MOTOR PARTS COMPANY

Post Office Station D, Cleveland, Ohio
Southwestern Branch
THE CARROLL CO.
2218 S. Harwood St., Dallas, Texas

The Ultimate Way WET INTERNAL GRINDING

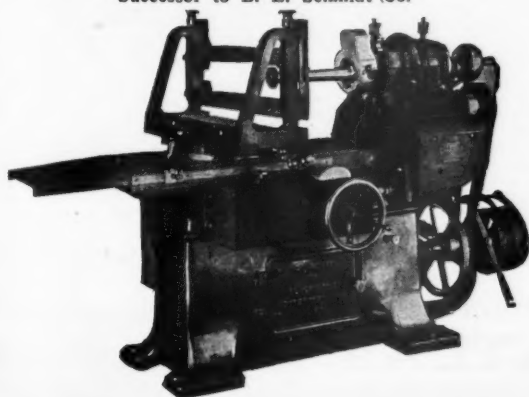
Wet grinding, as made possible by the Micro Internal Grinder is as far in advance of ordinary dry grinding as the present day automobile is over the old ox team.

Micro

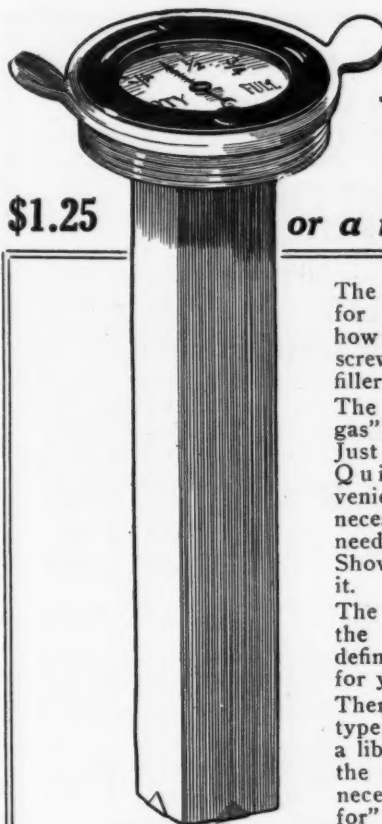
The Micro is a highly developed type of internal grinder adaptable for either wet or dry grinding, at the option of the operator, permitting highest quality of results. Its automatic action, both as to cut, feed and table travel provides the most accurate work humanly possible in exceptionally quick time.

If you're going to get a grinder, get the kind that will pay you biggest returns. Our bulletin gives full information—send for it.

MICRO MACHINE COMPANY, Bettendorf, Iowa
Successor to B. L. Schmidt Co.



\$1.25



Where's
Your Profit—
in a gas gauge
or a measuring stick?

The Tasco Gasoline Gauge for Fords shows instantly how the gas stands. Simply screw it in in place of the tank filler cap—and leave it there. The question of "How's the gas" is answered by one look. Just lift the seat cushion. Quick — accurate — convenient — simple — and necessary. Ford owners need TASCOS. They want it. Show it to them—they'll buy it.

The price is only \$1.25 but the value is practically indefinite as TASCOS will wear for years.

There's a TASCOS for every type of Ford car, and there's a liberal margin of profit for the dealer who handles this necessary and "real demand for" accessory.

THE AKRON SELLE CO.
AKRON, OHIO



A New High Standard of Valve Performance

SERVICE men and car owners are accepting the performance of Toledo Standardized Valves as the new and higher standard of serviceability. The heads are electrically welded to the stem. All Toledo Standardized Valves are annealed. They are easily "Ground In", thus forming and retaining a perfect seat in the motor block.

You make more money, the car owner pays less, and the motor performs better when you put Toledo Standardized Valves in the place of worn and pitted valves.

Stock number stamped on every valve. Packed 12 in an attractive carton. It is a valve you will like to sell.

Sold by leading jobbers everywhere

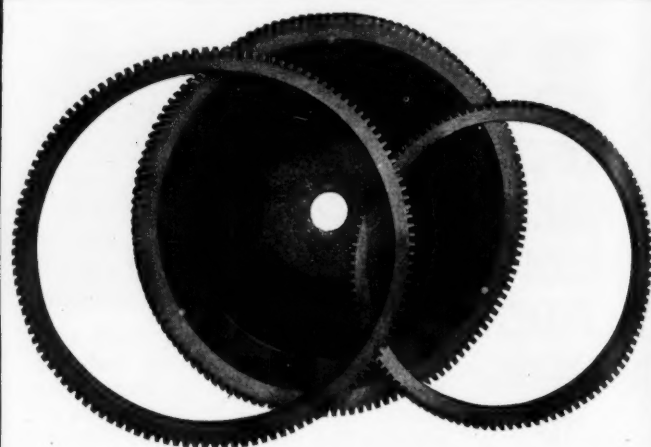
The TOLEDO STEEL PRODUCTS CO.

Valves exclusively for nine years
TOLEDO, OHIO

TOLEDO

Standardized

VALVES



Save Your Fly Wheels

When a tooth breaks in your starter gear why buy a new fly wheel. Simply turn off the gear teeth and fit on a Meachem Steel Ring Gear. It is much cheaper and will outlast the car. Ten thousand in stock.

THE MEACHEM GEAR CORP'N.
Syracuse, N. Y.

The National Automobile Shows Wonder Sensation UNIVERSAL AUTOMATIC SPRING OILER

Discovered and invented by Grus

Astounding and Unbelievable results

**GIVES PERMANENT
RELIEF FROM SPRING
SQUEAKS
OILER ATTACHED**



The Perfect
Leaf Spring
Lubricating
System

Retail Price
Regular Sizes
75c each

Complete Set of
Four for FORDS
\$2.50 per set

MANUFACTURED UNDER
GRUS BASIC PATENTS

Just think of it, no more broken springs; no more rusted springs; no more squeaky springs; no more inactive springs; no more wasted oil.

THE UNIVERSAL AUTOMATIC SPRING OILERS make your car run smoothly, easily, quietly, comfortably, begin immediately to lay a thin film of oil between the spring leaves. Just slip the oilers over the spring directly back of the spring clip and they are there to stay—will outlast the car.

Sold at

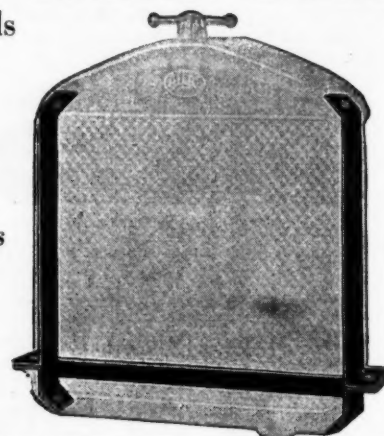
Accessory Stores, Garages, Department and Hardware Stores. If your dealer does not handle them, order direct. It takes two oilers for each half spring—one for each quarter spring.

A Few State Distributors Wanted—Write Quick

The Universal Spring Oiler Company
Dept. E Medinah Bldg., Chicago, Ill.
"SEVEN FACTORIES"

The Radiator that can stand abuse! for Fords

Good
Discounts



Big
Sales

The Atlas Radiator is built to stand abuse—it has a heavy steel bar across its rear face which is integral with the bracket supports and the Radiator sides. This means a vastly strengthened radiator as well as a sturdy reinforcement of the frame of the car. The Atlas is not only stronger it is more efficient. It has a flattened tube construction which gives it three times the water capacity of the tubular type and four times

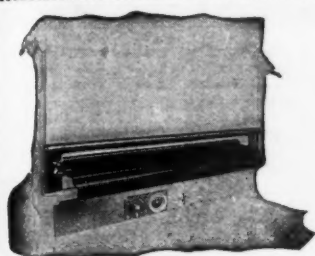
the cooling surface. Because of this construction the Atlas will not overheat in summer and because its brass honeycomb core is flexible and expands as the water freezes—it will not burst in winter. Made for all Fords and beautifully finished—the Atlas offers a big replacement opportunity to dealers.

The discounts are right. Ask for the details.

STEIDLE MFG. CO.

Cincinnati, Ohio

ATLAS RADIATORS
"The Radiator with a Back Bone"



Perfect Ventilation

Reduces discomforts of hot weather driving

The Phillips "Keep Kool" Ventilator is new—something to make the driver more comfortable and keep him in a happy mood. Ford owners will be glad to know about it. Show it to them.

7 REAL ADVANTAGES

1. Gives more ventilation than a tilted windshield or any other ventilator on the market.
2. Directs cool air on the feet of the driver.
3. Absolutely rain tight when closed — protects the coil box.
4. Made to fit standard Ford windshield frame.
5. Adjusted in an instant —no screws to make tight or loose.
6. Can be locked in any position and does not rattle.
7. Adds to appearance of the car and very easily installed.

Jobbers and Dealers. This is a thoroughly tested article —guaranteed. Sells readily and at a good profit. **Distributors Wanted! Write for your territory now!**

F. C. PHILLIPS CO., Stoughton, Mass.
Manufacturers Screw Machine Products.

Not a Specialty



A Necessity



A MASTERPIECE of mechanical perfection —reinforced at every vital point—built to serve long and well.

MALCO Universal Windshield Cleaner

Clamps on windshield frame at any point, or bolts thru hole drilled for that purpose—any kind of car. The only cleaner you'll need in stock—the only kind you'll be satisfied with.

PRICE \$1.50

Ask your jobber's salesman about the Malco products or write us direct, sending name of jobber.

Malco Products Corporation
220-224 West South Temple, Salt Lake City, Utah



Features of Construction No. 9

Tested Beyond Capacity

CANTON
PORTABLE
CRANE & HOIST



Before a Canton Crane is allowed to leave the shops it must pass a test that is carried considerably beyond its rated capacity. This is a feature of the utmost importance as it assures positive protection against injury to your men or damage to the work being done.

The Canton Crane is built to withstand the heaviest service found in the average garage or service station. It will give uninterrupted service for years. One man using it can handle work that would otherwise require from three to six men. It will pay for itself in less than a season in the time and labor it saves.

Our booklet describes in detail the various models. Write for a free copy.

Canton Foundry & Machine Co.

Canton, Ohio

New York Office: 203 E. 15th St.

Who Makes the Insulation of the Spark Plugs You Buy?

Consider for a moment the importance of an insulator to a spark plug. If the insulator fails, as it often does, the spark plug's usefulness is ended. So look to the insulation when you buy spark plugs.

Be certain that the insulator will withstand all sorts of abuse and have that "heating-resisting" efficiency so essential to long-lived spark plugs. If you want to be sure of these qualities—

Look for "775" on the insulator. It is scientifically manufactured to resist heat and give great strength. The practical proof for this remarkable goodness lies in the fact that most of the better spark plug manufacturers use "775."

FRENCHTOWN PORCELAIN CO.

Trenton, New Jersey

"Established in 1910—
Busy Ever Since"

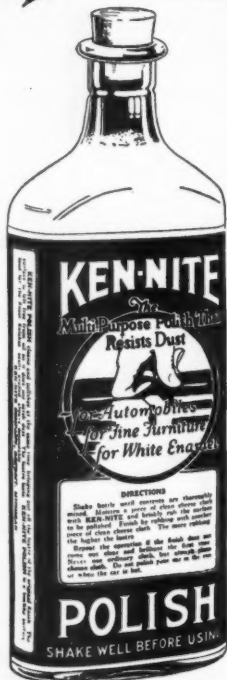
775
100% tested

Spark Plug Porcelain

Dealers—Jobbers—Send for This FREE Sample of

KEN-NITE

Cleaner-Polish



Find out for yourself what hundreds of dealers have discovered—that a higher price is no handicap when selling a used car cleaned and polished with Ken-Nite. In fact it's easier to get the high price than the low one.

Helps Sell Used Cars

Williams and Hastings, Michigan Hupp distributors get more on resale jobs than ever before, since using Ken-Nite. Some dealers report getting from \$25 to \$50 more for second hand cars cleaned and polished with Ken-Nite.

A friend of our president writes: "I bought a used car last week. It looked a year and a half younger than represented. Later I found it had been cleaned and polished with Ken-Nite. I probably paid \$50 for fifteen cents worth of Ken-Nite. I'll take my hat off to the boys who can put that across."

So you see, they not only pay, but LIKE to. Ken-Nite restores the original hard, dry brilliance of the paintshop's work. It doesn't cover with a shiny, melting, dust-catching skin. That's why repeat sales are many and frequent.

Liberal Jobber Discounts

Our sales are getting past the point of distribution direct to dealers. A concentrated advertising campaign will shortly bring volume up to thousands of gallons weekly. We need SELLING jobbers to handle that business. Write for our unusual terms and sales-help.

KEN-NITE COMPANY

4855 Woodward Ave.
Detroit, Michigan



Just Clear The Cylinder

No skilled help is required to resize cylinders with the Auto-Hone — it is so simple and effective.

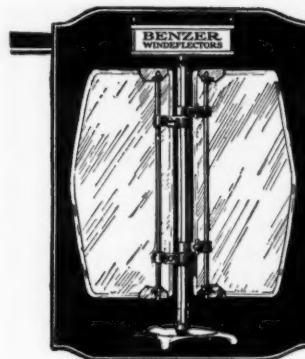
It ordinarily takes about four days to completely dismantle a motor—send the bloc out for cylinder resizing — get it back and reassemble the engine.

The modern way is—connect the flexible arm of the Auto-Hone to your electric drill—slip the Auto-Hone into the cylinder—turn on the power—and in fifteen to twenty minutes the four honing stones remove the usual five to seven thousandths out-of-round—all traces of taper — ring travel — unevenness — leaving a clean, smooth, polished cylinder surface.

Every Garage and Service Station can make a big profit.

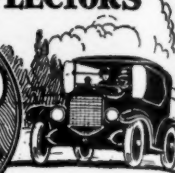
Put aside questions—disputes—curiosity—and get the facts. Order yours—today.

THE **AUTO-HONE CO.**
GENERAL OFFICES 1587 MAIN STREET
BUFFALO, N.Y., U.S.A.



BENZER WINDEFLECTORS

\$15⁰⁰ pair



Unbeatable!

Miles ahead of competition. Benzer Windeflectors are made of finest plate glass, 1/4 inch thick, with a half-inch bevel, and metal parts of nicked solid brass.

This retail price brings a big profit to you and brings it often.

This "Silent Salesman"

will give Benzer Windeflectors prominence in your store. This stand sent Free with your order for 3 sets.

Write your jobber today;
he has them.

THE BENZER CORPORATION

Myrtle, Cooper & Webster Aves.,
Brooklyn, N. Y.

BENZER
AUTOMOTIVE
GLASSWARE

Put a Storm Cylinder Finishing Tool at Work in Your Shop

Without adding any extra help or expense and investing as little as \$36.25 in a Storm Cylinder Finishing Tool you can now turn out the most profitable shop work in the shortest time—give a cylinder finish never before approached—do it in less time, do it better, and make more money on every job. Used with Electric Drill, Drill Press, or with Storm Automatic Cylinder Finishing Machine. Absolutely self centering. Capacity 2 1/4 to 8 inch with unvarying, correct pressure.

Write for new book on
Modern Cylinder Methods.

STORM MFG CO

Dept. A 406 Sixth Ave. So., Minneapolis



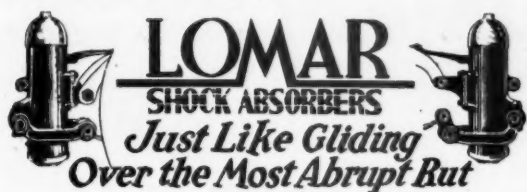
Steady High PERFORMANCE

Is a certainty with the new Waukesha Bus and Truck Motor. Operating costs are a revelation in motor economy.

Write for complete details.

The Waukesha Motor Company
Waukesha, Wisconsin

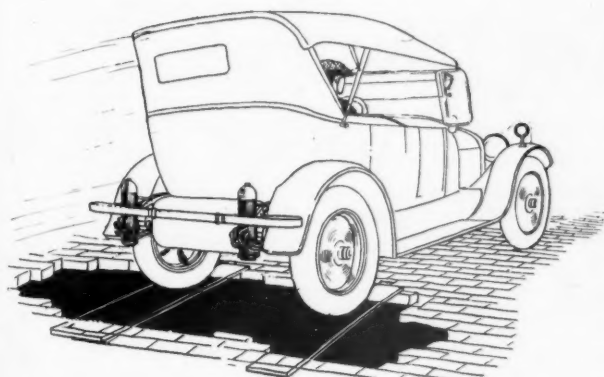
BUS and TRUCK MOTORS



One demonstration—one ride on Lomar Shock Absorbers and they are sold tight. They positively prevent jars and shaking up. They give the car occupants that "Floating through air" feeling.

Shall we send you our proposition?

LOMAR MFG. CO.
Middletown, Ohio



CRANE PULLER

Gets 'Em All



The most stubborn wheel lets go when the Crane Puller is used. No fear of breakage—the Crane design and Crane materials make these pulling tools more than equal to their job.

Arms drop forged from high carbon steel, screw case-hardened with inserted tool steel point.

Three models, including the new universal Two-arm, Three-arm Crowfoot model, 4 sizes of each. Real tools for busy mechanics.

Our 24-page folder gives you the whole wheel-puller story. Write for it.

CRANE PULLER CO.

Arlington

Mass.

The MOHAWK

SLIDING GEAR TRANSMISSION for FORD CARS and TRUCKS

DEALERS
Here is the
BIGGEST
PROFIT MAKER
IN 1923

Ford truck and passenger car users everywhere want MOHAWK Sliding Gear Transmissions. Produces more power and flexibility. Stops destructive vibration and motor racing. Attaches at rear of old transmission. Can be used with or without the old transmission. When used with you get SIX SPEEDS FORWARD and TWO REVERSE SPEEDS. When used without you get THREE SPEEDS FORWARD and ONE REVERSE.

Guaranteed for Life of Car or Truck

The Mohawk Transmission will outwear the car or truck in which it is installed. It is a complete unit in itself. Gives the Ford a speed for every road or hauling condition. Eliminates planetary troubles and necessity of replacing bands. In Ford truck the MOHAWK will pull three tons anywhere traction is possible. Built with nickel steel gears. Standard ball shift type gear lever and right hand emergency brake. The MOHAWK Transmission equipment can be installed in from five to six hours with an ordinary set of tools. No machine work necessary. Comes ready to install. Write for full description and prices.

Dealers: Write quick about open territory

MOHAWK MFG. CO.

Dept. M, Peoria, Illinois

Every "STOP" Light
needs this
Switch



Price
50
cents

*—bound
to sell fast*

Jobbers

Dealers

Every STOP light owner is a prospect. You will be interested in our special trade offer—and discounts.

Car owners will buy Elm City No. 50 Switches just as fast as they learn about them.

For an Elm City No. 50 will make any "STOP" signal work. It has never been known to fail.

Dealers like to handle it because it is popular and sells fast.

All brass—even the spring. Water, dust and rust proof. Mechanically perfect. Absolutely guaranteed.

Get the details.

The C. S. Mersick & Co.

274 State Street, New Haven, Conn.

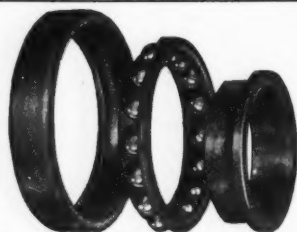


Re-Babbitted Bearing Exchange

We Re-babbitt any Automobile, Truck or Tractor Connecting Rod or Main Bearing with **HIGHEST GRADE NICKEL BABBITT** and finish them regular Factory sizes. All work guaranteed satisfactory or money refunded in full and transportation paid both ways. All RUSH Orders shipped same day order arrives.

We shipped over 100,000 Bearings last year. Over 5000 satisfied Dealers and Garages will recommend us. Save one-third to one-half your Bearings costs by sending us your work. Ship Parcels Post or Freight. We sell wholesale only.

Fremont Foundry & Bearing Works
Oklahoma City—U. S. A.



The Bearings Company of America
Lancaster, Penna.

Angular Contact Radial Bearings—Angular Contact Thrust Bearings—Thrust Ball Bearings—"STAR" Ball Retainers for Thrust, Magneto, and Cup and Cone Bearings.

Your inquiries are solicited

Western Sales Office,
1012 Ford Bldg., Detroit, Mich.



PAROB EXPANSION HAND REAMER

BLADES CUT AT DIFFERENT ANGLES

Each successive blade cuts AT A DIFFERENT ANGLE from the one before it.

No CHATTER, no DIGGING IN—even in keyed holes.

TWICE the expansion of others. All sizes. Money-back guarantee.

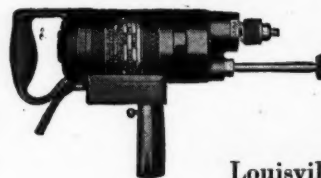
Ask about the GAMMONS TAPER PIN REAMER—Wonderful Time-saver.

THE GAMMONS-HOLMAN CO.

Dept. C.

Manchester, Conn.

Get This "Pioneer" Garage Special



Electric Drill and Valve Grinder

Greatest time and money saver, as well as money maker, for your shop—

"It Will Do The Work"

Louisville Electric Mfg. Co.

Incorporated Louisville, Ky., U. S. A.
C. E. Willey, Pres. J. B. McFerran, Secy.-Treas.



Ford, Buick, White and Other Foremost Auto Manufacturers Use —

Rubyfluid

For All Metals

COMBINATION SOLDERING AND TINNING FLUX

A complete substitute for dangerous acids, commonly used as a Flux. Ruby Fluid is quick acting, anti-rusting and always ready for instant use. Ruby users include the foremost industries of the country. NON-EXPLOSIVE, NON-CORROSIVE, NON-INJURIOUS.

THE RUBY CHEMICAL CO.

68-70 McDowell St.

Columbus, O.

JOHNSON No. 7 Hand Torch



Requires No Forced Air Blast

The most efficient Torch for any pre-heating, soldering or repair work.

Fitted with one Powerful Johnson Burner with shut-off valve and pilot light.

Will produce a flame temperature of 2250 deg. Fahr. Is light, weighs 1½ lbs., and only consumes 10 cu. ft. of gas per hour.

Write for descriptive circular of Gas Appliances.

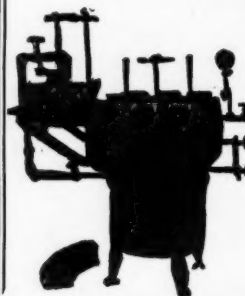


JOHNSON GAS APPLIANCE CO.
Cedar Rapids IOWA

Air-Tight Steel Tank Co.
PITTSBURGH, PA.



Tanks—High Pressure and Storage—Regular and Special to Order—Brazed or Welded—Gasoline Storage Tanks and Pumps—Structural and Machine Work. Send us your inquiries or specifications.



The Standard Vulcanizer Equipment for Repair Shop Use

A complete line, covering every requirement of the trade.

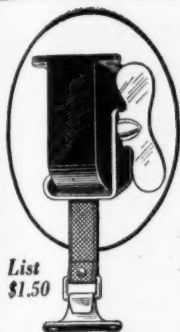
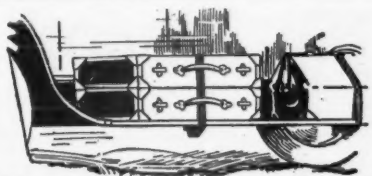
—Vulcanizers, Retreaders, Tube Plates, Steam Boilers, Tools, etc.

Write today for descriptive literature.

THE AKRON RUBBER MOLD & MACHINE CO.

919 Sweltzer Ave., Akron, Ohio

AKRON-RUBBERMOLD
TIRE REPAIR EQUIPMENT

List
\$1.50**Easier to Sell!**

Motorists will buy the Hykon Luggage Carrier because it's the most practical carrier they have ever seen—and so inexpensive. Placed under the running board, Holds luggage secure. Durable and easy to use. List \$1.50. Ask your jobber.

THE HYKON MFG. CO., Alliance, Ohio

Hykon

LUGGAGE CARRIER

E-C-L Pistons

ALUMINUM ALLOY NON EXPANDING

**How to Eliminate Piston Slap**

Piston Slap is a common and vexatious cause of engine trouble which in the past has bothered most car owners.

But it can now be eliminated.

With the E. C. L. Aluminum Alloy Non-Expanding Piston. E. C. L. Pistons may be fitted with a closer degree of clearance than cast iron pistons. They reduce the consumption of gas and oil — increase power and speed and eliminate spark knocks.

Let us tell you more about this remarkable piston. Write for the details today.

E. C. LONG

Main Office and Factory

4834 Beaubien Street

Detroit, Mich.

PARANITE CABLE

Best for Automotive Work

We carry at all times a complete stock of every kind of cable used for automotive work. Many years of specialization have brought **PARANITE** Cables to the highest state of perfection. The finest grades of rubber compound, cotton and flexible enamel varnish are used.



FOR 33 YEARS THE STANDARD
IF IT'S **PARANITE** IT'S RIGHT
Quality jobbers handle quality cable—
that's **PARANITE**.

Indiana Rubber & Insulated Wire Co.

210 S. Desplaines St., Chicago

Factory and General Offices—Jonesboro, Ind.

MR. RADIATOR REPAIRMAN

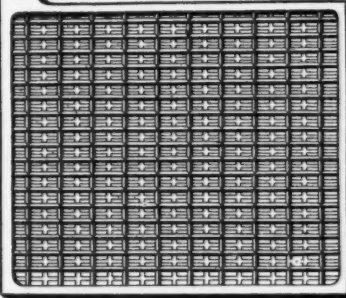
Make your own radiator cores and save 20% to 50% of their cost, give your customers quick service and a better core for less money. No need to carry large stocks of cores, and no damage in shipping. Increase your volume of business. Send for illustrated booklet describing our radiator core equipment. We supply small shops with formed core stock and the small fixtures to build cores complete. Write for information to

Radiator Engineering Co.

626 Nesselwood Ave.

Toledo, Ohio

Cramer Reinforced Plates for Battery Makers



These reinforced plates are constructed with sufficient brace to withstand the most severe strain.

The active material is locked into the plates—preventing buckling or splitting.

Cramer Reinforced Plates are specially built for hard service.

Send for full particulars.

CRAMER BATTERY COMPANY

515-17 Wyoming Ave.

Scranton, Pa.



MORE POWER
GREATER MILEAGE

Do You Understand Two-Plug Ignition—

the system that ignites the gas at two opposed points at once? This burns the mixture completely and almost instantly; increases power and gasoline mileage; saves fuel and lessens carbon accumulation and spark manipulation. SU-DIG Series Spark Plugs added to the plugs now in your engine give Two Plug Ignition.

A Wonderful Improvement in the running of your car. No change in present equipment required. Write for free booklet, "How to get More Power." Please mention car.

Superior Motor Power Co., 75A Spring St., New York

**Universal!**

No. 2051—\$3.75

Because one or more Units of Basco Automotive Electrical Equipment or Body Hardware appear on the majority of American cars and trucks, the Basco Service Franchise is becoming steadily more profitable and more popular. A strong, responsible organization—a leader for 12 years—stands behind the Basco dealer.

BASCO PRODUCTS—Starting, lighting and Ignition Switches; Generator Cutouts; Horns; Body Hardware. Write for NEW catalog.



Briggs & Stratton Co.

Milwaukee, Wisconsin

The KESS HIGH SPEED VALVE GRINDER

A new valve Grinding device—
Cuts Costs—Costs Little

A TREMENDOUS BOOSTER
for High Speed Drill Sales

Liberal terms to Distributors and Jobbers

Get the Details

KESS MANUFACTURING CO.
809 HARRISON BLDG., PHILADELPHIA, PA.

**WEIDENHOFF PRODUCTS**

Electrical Testing Equipment

Universal Test Benches, Growlers, Magnetizers, etc.

Write today for Bulletin M-18.

4358 W. Roosevelt Rd., Chicago, Ill., U.S.A.



The "UNEEK" and "OTIS"

Hose Clamps

are in a class by themselves

OTIS-FLAGG CORPORATION

Main Office and Factory YORK, PENNA.

CYLINDER HONES

Can be operated without removing engine from vehicles. An absolutely true hole. Small first cost. Large profits. Have efficiency of large, expensive grinders.



KALAMAZOO

MICHIGAN

KISSEL

The Custom Built Car

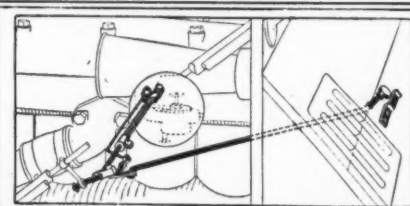


The Aristocrats of
Motordom

7 Models—Open and Closed

Distributors in principal cities. Open territory now being closed.

Kissel Motor Car Co.
Hartford, Wis.

**THE GREEN LINE FOOT ACCELERATOR**

Quickly installed, no bolts to remove. Action is easy and positive. Works free from hand throttle. Floor boards can be removed without disturbing Accelerator.

Write for full particulars.
Price \$1.25
Green Manufacturing Co.
506 Second St., Milwaukee, Wis.

**THE HYDRAULIC CONTROL**

More than a Shock Absorber because it fluid-cushions all movements between the body and the chassis—gives a new experience in riding comfort.

Good distribution territory is still to be allotted. For information write to

AUTO SPRING CONTROL CO.
Jamestown, N. Y.



WEAVER

GARAGE AND SHOP EQUIPMENT

WEAVER MANUFACTURING COMPANY
SPRINGFIELD ILLINOIS U.S.A.

Send for Catalog



TASGON

The Original Spring Lubricant

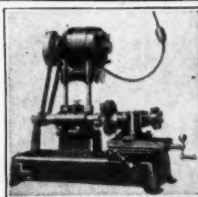
CURES RUSTY SQUEAKY SPRINGS

Prevents Carbon. Cleans Spark Plugs. Loosens Sticky Valves and has hundreds of uses on the car and in the garage.

POLYGON PRODUCTS CO.

141 Milk St.

Boston, Mass.

**SAPIHL VALVE GRINDER**

No Chatter Marks, Vibration or End Play

TEN DAYS FREE TRIAL

Besides grinding valves it will make money for you grinding pistons, contact points, bushings, reamers, etc. Built in two units and can be attached to lathe for internal and external grinding. Does the work of higher priced machines.

Write for illustrated circular and prices

General Tool & Equipment Co.

Distributors

70 W. Monroe St.

Chicago



Specify "R. S. P. VALVES"

Special Alloy or Chrome Nickel

Send for list

Standard and Oversize—Forged in one piece

RICH STEEL PRODUCTS CO.

Los Angeles, Cal.

Battle Creek, Mich.

**F-40 For Fords**

and Chevrolets. A thrust bearing for the differential. Makes 'em push easier, climb better, dodge axle trouble.

Bantam Ball Bearing Co.
Bantam, Conn.

**Bosch**

Manufacturers are invited to get in touch with us regarding their ignition requirements.

Robert Bosch Magneto Co., Inc.

The Genuine, Original Bosch

Otto Heins, Pres., 123 West 64th St., New York

**YAHOOOTA**

Let your customers hear the
Sparton speak!

Special display board given free with initial order for six. Write for complete particulars.
The Sparks-Wilmington Co., Jackson, Michigan

WEL-EVER OIL CONTROL PISTON RINGS

Write for interesting circular on oil pumping and details about this fast selling piston ring.

THE WEEVER PISTON RING CO.

1713-15 Canton St.

Toledo, Ohio

STEVENS TOOLS

SPEED UP



OVER 50 WONDERFUL SHORT CUTS
IN NEW CATALOG T-105

ASK FOR IT

STEVENS & COMPANY

375 BROADWAY, NEW YORK



JACOBS CHUCKS INSURE ACCURATE DRILLING

Write for circular, "A Jacobs Chuck
for Every Purpose."

THE JACOBS MANUFACTURING CO.
Hartford, Conn.

GET ACQUAINTED WITH GASKO CEMENT

It's Better Than Shellac for Motor Gaskets
Send 25c in stamps for Trial Tube—Today.

VAN SICKLE MFG. CO., Lincoln, Nebr.



CARTER OIL GAUGES

For Ford, Chevrolet and Dodge—Only \$3.75
Buick, Oakland and Chandler—\$5.00

ACCURATE—EASY TO INSTALL—GUARANTEED

Screw gauge to dash or instrument board; connect copper
tube with elbow in place of lower petcock. No oil passes
thru tube or gauge. No moving parts, floats or plungers.
Easy to sell; easy to install. Big money-makers.

Order from your jobber or write for discounts.

Carter Motor Accessories, Inc., 388 Pearl St., Buffalo, N. Y.

K-D Parallel Jaw
Valve Spring Lifters

Does Your Jobber
Carry K-D Specialties?

K-D MANUFACTURING CO.,



K-D No. 100
Cut-Out Pedal

Dealers Write NOW
Sending Jobber's Name

Lancaster, Penna.



There is a Harvey
Steel Disc Wheel in
the various styles
which we make for
each size of car at
interesting prices.



Rim & Wheel Co., Inc.
25 E. Jewett Ave.,
Buffalo, N. Y.



Auxiliary firing-chamber
gives it the explosive
power of a howitzer.
Carburetor must be ad-
justed LEANER imme-
diately. Overcomes oil,
self-cleaning.

Distributors wanted.

NT
SPARK PLUG

With the Explosive Spark

THE T. N. T. SPARK PLUG CO.
Cleveland, Ohio

ARE YOU LOOKING FOR A REAL BARGAIN?

Watch the classified advertising columns of MOTOR AGE and you'll see many
of them. Often a man has goods for quick disposal and he announces the
fact here. Whether or not you are in the market right now for certain things
you will find it pays to look over the classified ads every time you receive your
copy of the paper. It's a good habit to get into and some day you'll be
mighty glad of it.

Get the Habit—

READ THE CLASSIFIED ADS IN MOTOR AGE

Empire

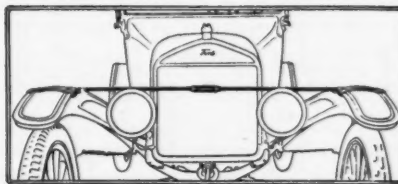
Tires and Tubes

"Wear Longest"

THE NEW EMPIRE
DISTRIBUTION PLAN
enables dealers to make extra profits on
these well known super-standard casings
and tubes.

Empire Tire & Rubber Corp
TRENTON NEW JERSEY

JOBBER WANTED



to handle the WYNONA FENDER BRACE

A patented, permanent, adjustable brace for Ford car fen-
ders. More than 15,000 sold in March. Fastest selling
fender brace on the market. Write for details.

Wynaona Fender Brace Co.

1217 Southwest Blv'd

Kansas City, Kas.

Powerful Battery— Powerful Seller

The Dragon is full of power and endurance.
That's why it pleases the user.

Make it your business to please your custom-
ers. Find out about the Dragon franchise.

Write or Wire

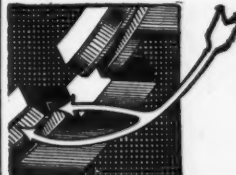
ENGLERT MANUFACTURING CO.
Pittsburgh, Pa.

Dragon Storage
Battery

WARNER GEAR COMPANY, MUNCIE, INDIANA



CLUTCHES, TRANSMISSIONS, CONTROLS, DIFFERENTIALS

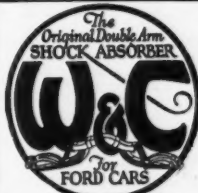


See the Beveled Edge and Oil Groove
of the Universal One-Piece Piston Ring

Forced Lubrication Prevents Foul Plugs. The beveled
top edge and central groove keeps oil from the com-
bustion chamber—reduces carbon. Dealers—Write for
the details.

UNIVERSAL MACHINE COMPANY
Baltimore, Maryland

H. G. Paro, 1412 S. Michigan Ave., Chicago, Ill.



SAY "W. & C."

and Your Jobber Will Give You the
Most Successful

Time-Tried Shock Absorber for Fords

W. & C. Shock Absorbers Sell

P. H. WEBBER COMPANY

Hoopeston

Illinois



For information about the
Durant and Star Car selling
franchises write

DURANT MOTORS, Inc.

500 Jackson Avenue,
Long Island City, N. Y.





One Dealer Sells 125 in One Month
Similar reports about the Optoshield are coming in constantly from all parts of the country. This accessory has taken its place among the most popular sellers in recent years.

THE OPTOSHIELD

Fits any windshield. Made of sapphire blue scientific glass. Driver looks through it and is relieved of all eye strain from oncoming head lights, sun glare, snow glare and road glare. Price \$3.50. Territorial distributors, dealers and agents wanted.

Detroit Sales Service Co., 1647 Penobscot Bldg., Detroit, Mich.



Air Compressors; Gasoline and Oil Storage Systems; Heavy Metal Storage Tanks; Oil Burning Systems; Furnaces and Forges; Oil Filtration Systems; Water Softening Systems.

WAYNE TANK & PUMP COMPANY,
706 Canal Street, Fort Wayne, Ind.

Wayne



GIANT

SHOCK ABSORBERS

Built exclusively for Dodge Brothers Cars. The Shock Absorber with the remarkable guarantee. Write at once for full particulars.

RED GIANT TOOL CORP.,
Lynchburg, Va.



Single and wide face Tailor made high grade bumpers

The Bellevue Manufacturing Company
Bellevue, Ohio

Welco Products Are Quick Sellers

All-Size Step Plate fits all running boards by simply moving toe plate forward. Welco Ford Accelerator works independently of hand throttle; very easy installation. Welco Blanket Holder keeps blanket securely on radiator against strongest wind. Write for trade proposition.

WELKER MANUFACTURING CO., Middletown, Conn.

WELCO Products

KING QUALITY ALL THE NAME IMPLIES PISTON PINS

Automotive Division

KING SEWING MACHINE CO.

Buffalo, N. Y.

Bridgeburg, Ont., Can.

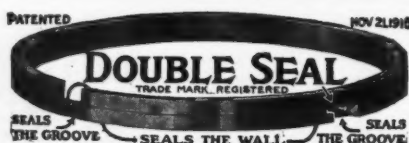


TRADE MARK
Reg. U. S.
Pat. Off.

OILING SYSTEM FOR FORDS

JOBBERs are offered an opportunity to cash in on a strong advertising and sales campaign on a necessity Ford owners are glad to buy. Ask for particulars.

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411 So. Main St.
Los Angeles, Calif.
2715 N. Broad St.,
Philadelphia, Pa.



SEALS THE GROOVE SEALS THE WALL THE GROOVE

DOUBLE SEAL RING COMPANY

General Sales Office: 2335 S. Michigan Avenue,

CHICAGO

Seals both the cylinder wall and the piston groove—the double sealing feature that has made this ring famous. Write for our dealer proposition—it's a mighty good one.

PETERS Crank Shaft Grinder

(Patented)

PRICE \$75.00

does perfect job without taking motor down. Rebabbling unnecessary. Fits all sizes of crankshafts. No skill required. Send for circulars on this, also Peters Universal Bearing Reamer, Connecting Rod Bearing Reamer, Metallic Filler, Aluminum Brazing Solder.

PETERS ENGINEERING CO.

33rd Street and Woodland Ave.

Phila., Pa.

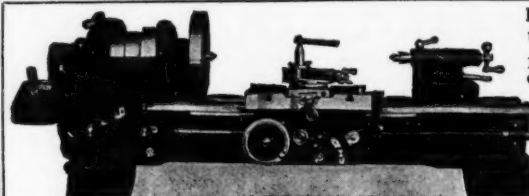
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For
HUDSON
&
ESSEX CARS

The Bradley Motor Products Co., Fostoria, Ohio

No. 1. The Hatfield Tire Carrier. One pull on a lever removes tire and rim. Thief proof. Write today.
No. 2. Feature. The Hatfield Trunk Equipment. Hudson and Essex Dealers are cashing in on these 2 Big Features.



LATHES
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Be sure to get
our Special
Prices.

Carroll-Jamieson
Machine
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The World's Highest Grade
Ignition, Starting & Lighting.

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PHILADELPHIA, PA.

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Taps, Dies, Cutters, Drills, Reamers

Send for Catalog

ALVORD REAMER & TOOL COMPANY
Millersburg, Pa.

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Adjustable. Two sizes will clamp any hose of any diameter. Made from cold rolled steel out of wire. No rough edges to cut hose. Put on in less than a minute. Everlastingly leak-proof. Order Universal Hose Clamps. Trademark on every clamp and carton. Get them from your jobber—or write us.

UNIVERSAL INDUSTRIAL CORP.

Hackensack, N. J.



The COURIER Six

Nine body types,
from \$1,195 to \$2,165

THE COURIER MOTORS COMPANY
SANDUSKY, OHIO



DOUBLE YOUR OIL SALES
Install one or more units of the Correct Measure Motor Oil Display Pump on your curb. "Make him think of oil." This pump is handsome in design, sturdy, holds 12 gallons. Empty weight 65 lbs. Low center of gravity. Can be rolled to curb in morning and back indoors at night. Delivers ½ gal. in 12 seconds. Price \$45 per unit. Write for details.

CORRECT MEASURE
MOTOR OIL DISPLAY PUMP

Correct Measure Co., Inc. Rochester, Pa.

LINENDOLL EXHAUST HEATER

Warms any car, open or closed. No odor, smoke, dust or noise. Easily installed, operated and cleaned. Sells quickly. Write for our attractive trade proposition.

THE NORWALK AUTO PARTS COMPANY
Norwalk, Ohio

GRINDING MACHINES **LANDIS** BORING MACHINES

LANDIS TOOL COMPANY
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"CONNEAUT" Plastic Metallic Packing
Patented June 18, 1918

Stops the leaks in automobile water pumps. Mold it with your fingers. Makes a smooth, metal bearing—adjustable and practically frictionless. At your Jobber—Get it today. It does the trick. Put up in 1 lb. cans.

The Conneaut Packing Company Conneaut, Ohio

Silver Edge Raybestos

THE RAYBESTOS COMPANY
Factories: Bridgeport, Conn. Peterborough, Ont., Canada.
Branches: Detroit, 2631 Woodward Ave.; Chicago, 1603 South Michigan Ave.; San Francisco, 835 Post St.

Equip Your Shop
with
HOYT Electrical Testing Instruments
Burton-Rogers Co., Boston, Mass.

Built like a bank vault

Johnson
SPARE TIRE LOCK

Made by
JOHNSON AUTOMOBILE LOCK CO.
DEPT. B. ST. LOUIS, U. S. A.

HIGHER PRODUCTION
GREATER SAFETY
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WRIGHT
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LISBON, OHIO

HIGH SPEED HOIST

HANDI-PAN
Mfg. by
Robertson Bros. Mfg. Co.
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Like a Pocket in a Shirt
Has many uses. Drain crankcases, test tubes, scrub parts, carry tools, keep parts, throw scrap in it. One piece of heavy gauge galvanized steel. Won't tip over. List price \$2.50. West of Rockies \$3.00.

Sales Dept.
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PROMPT SERVICE
we will give you on
FOSTER PISTONS
for almost any make of CAR, TRUCK and TRACTOR

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SAV-OIL
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IT'S EASY TO SELL
"The only oil ring with a mileage guarantee"
"Sav-Oil" is stamped on bottom of every ring

The Sav-Oil Ring Mfg. Co.
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Side Wall Model. Dash Insert

THE FARGO
ASH RECEPTACLE

It Does Sell for Two-fifty. Get Some!

THE FARGO CO., Inc. 303 Watson St., Ripon, Wis.

It's all right—this Ford is equipped with Rush

Adjustable Emergency Brake Shoes
W. S. Rush & Co., Mfrs., 112 N. Daly St., Los Angeles, Calif.
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Rush Timers—Rush Transmission Band Oilier & Cooler

R&V Knight
SIX
"EVERLASTING PERFORMANCE"
Engine Sealed and Guaranteed for 2 Years

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SOCKETS WILL NOT BREAK
This new socket wrench is something every mechanic has long wanted. Made from selected stock, specially heat-treated and hardened. No other sockets are quite so strong, no other ratchet quite so well made, no other universal quite the same. Care and quality is evident in every unit. Exceptional facilities allows marketing at an attractive price. Write for guarantee.

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BOWSER
ESTABLISHED 1885

ACCURATE MEASURING PUMPS

S. F. Bowser & Co., Inc. Home Plant, Fort Wayne, Indiana

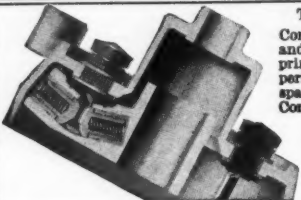


"Silence is golden." So is the Cloyes Timing Gear.

For it assures a silent, smooth running motor—permanently. And this pays.

CLOYES GEAR WORKS

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SALES REPRESENTATIVES
UNITED AUTOWARE CO.
Fisk Bldg., N. Y. C.

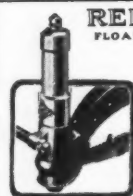


THE DOUBLE CONTACT TIMER

Combines the "wipe" and "roll" contact principles. Gives full, perfectly synchronized spark at all speeds. Contacts are positive and unfailing. A wonderful dealer proposition. Write

E. D. Hodge Tool & Mfg. Co.,
Watertown, N. Y.

Twin Timer
FOR FORD CARS TRUCKS & TRACTORS



REID AIR SPRINGS

FLOAT THE CAR ON AIR

Most highly developed but lowest priced Air Spring. No side sway or tipping at turns.

Can be installed by dealer who sells them. Big opportunity for distributors and dealers—sales are easy—discounts long. Write.

THE
REID AIR SPRING CO.
New Haven Conn.



Kant-Skore PISTONS

WEIGH LIGHTEST • FIT TIGHTEST

Regrinders, Repair Men, Dealers Write for literature, price list and liberal proposition. Prompt service and delivery on all standard and special oversizes up to .065. Over 600 models.

THE KANT-SKORE PISTON CO., Cincinnati, Ohio, and Kansas City



STOPS GUESSING

Indicates definitely direction driver intends to turn. Signals at both front and rear of open or closed cars. Meets requirements of all State laws. Attractive—Durable—Effective. Dealers—Jobbers, write for details and territory. The Motor Products Co. Norwalk, Ohio

INTERNATIONAL MOTOR TRUCKS for low-cost hauling

Models range from the 2,000-lb. Speed Truck to the 10,000-lb. truck. Some territory is still open for dealers.

International Harvester Company of America
(Incorporated)
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AXLES, Keys, Nuts, SPRINGS

WE MANUFACTURE replacements for all makes of cars and sell to jobbers all over the world.

BUTLER AUTOMOTIVE STEEL CO.

Factory: 101 K Street, Easton, Pa.

Piston Pins



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Oversizes

Standards

Specials

Prompt shipment, highest grade materials, precision accuracy to closest dimensions and unexcelled workmanship. Send for specification and price lists—they make pin and valve buying simple. THE TRINDL CO., 2917 Wabash Avenue, Chicago, Ill.

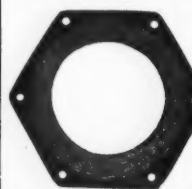
Motor Wheel PRODUCTS

Motor Wheel Corporation, Lansing, Michigan

Send
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Catalog

TESTING EQUIPMENT FOR ELECTRICAL SERVICE STATIONS

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GUAY CLUTCH DISC & PLATE

For Dodge Bros. Cars

Models for other cars will be announced shortly. Extraordinary flexibility and durability are gained by passing every thread of asbestos over and under the steel fingers at a given length of 3/4 inch. Thus all strings are under the same measured spring tension. Steel and asbestos only materials used. No wires or rivets to cause uneven wear. Price of complete set, \$12.00. Good discounts to trade. Write for complete details.

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Mfg. Division 150 W. Illinois St., Chicago



"DUPLIX" \$5

Second Spare Tire Carrier And Rim Tool All-In-One

Attached or removed without tools, no installation cost, no time wasted, sale is complete over the counter. DOES A \$10 JOB FOR \$5.

Locks both tires—Tires cannot chafe—Does not interfere with the use of tire covers—Improves the appearance of a car—Does a 100% job as a rim contractor and expander—Can be transferred from one car to another—Only one size to stock for all.

TRIPP-SECORD & CO.
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BURNLEY

RADIATOR CEMENT

Quicker—Safer—More Profitable

THE BURNLEY BATTERY & MANUFACTURING CO.
Northeast, Pa.



KOKOMO RUBBER CO., Kokomo, Indiana
131 South Main St.

Kokomo Long Life tires and tubes make money for dealers who handle them.

Kokomo Twin-Grip Fabrica
Kokomo Two-Grip Cords
Kokomo Everlast Red Tubes
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GEAR
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PERFECTION Silent Timing GEARS

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Michigan Ave.
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SILENT
DURABLE
DEPENDABLE

WORLD'S
STANDARD
REPLACE-
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Challenge Windshield
DRIVEN LIKE A SPEEDOMETER



Distinctive in Appearance.
Most powerful in action.
Most durable in operation.
Sells on sight.

\$6.50

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The Spencer Lock Tilting Steering Wheel first adds comfort in the driver's seat—then protects the car from theft. And the insurance it saves pays back the purchase price. Ask your jobber for details. Made for Ford, Dodge, Overland, Chevrolet 490 and Superior, Maxwell, Star and Gray Cars.

Should Be On Every Car You Sell

The Spencer Mfg. Co.,
Spencer Ohio

DIAMOND
Automatic Automobile
SAFETY SIGNAL



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AUTOMOTIVE DISTRIBUTING CORPORATION
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Automobile and Radio batteries charged for a nickel. Ten million car owners and five million radio fans are prospects for

THE HOMCHARGER


BIG PROFITS. WRITE NOW.
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Cyclo "Dynamic" Hot-Spot
For Fords

25 to 30 miles per gallon is the rule rather than the exception among CYCLO users. VACUUM HEAT-CONTROL insures plenty of power under all conditions. Ask about our "Rapid Transit" selling plan

Cyclo Manifold Co., High & Chestnut, Akron, Ohio



Wedge-Rite
Piston Rings



Wedge-Rite piston rings are 3-piece rings following the best engineering practice. The patented wedge takes up the wear, keeping the groove and cylinder wall tight against oil and compression leakage. Wedge-Rite Piston Rings are made from the best individual castings.

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Pittsburgh, N. Y.


Inshield
SPOT & SERVICE
LIGHT COMBINED

FITS ALL CARS
OPEN & CLOSED

The Light that Means Most to The Motorist

MADE IN TWO SIZES
ASK YOUR JOBBER

MFG. BY THAL & BITTER MCH. CO. TOLEDO, O.




AMERICAN SPRINGS
AMERICAN AUTOPARTS COMPANY



9775 FRENCH ROAD
DETROIT MICHIGAN

ANY CAR ANY MODEL ANY YEAR

TAKE THE END-PLAY OUT!
—WITHOUT PULLING THE MOTOR



THE C. A. ADJUSTABLE CENTER BEARING CAP corrects Ford crankshaft end-play and sets magneto for highest efficiency without removing the motor. Easily and quickly installed. Guaranteed for one year. List price \$3.75. Ask your jobber or dealer or write us direct.

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Dept. M. Brazil, Indiana

FRONTENAC Cylinder Heads
and FRONTY-FORDS



Designed and built by the famous race drivers and engineers. Arthur and Louis Chevrolet. Write for FREE Illustrated Catalog. Book on "How to Build a Fronty-Ford," \$2. Given free with orders of \$50 or more.

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CABLES of Quality
The Packard Standard since the beginning of the industry.


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DIAL GAUGES

When you find Ames dial gauges in the finest automotive shops, on close limit work—there's a reason. Let us tell you why. Write TODAY.

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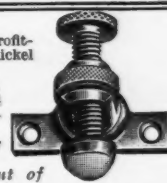


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of TODAY
MOTOR CAR EARL MOTORS, INC.
Jackson, Michigan

JOBBERS

Do not overlook these live selling and profitable items. The metal is brass, heavy nickel plated and will not rust. Four styles—one for every car. No. 503 with the Hump Base. No. 504 with Ell Base. No. 505 Plain Lock-Type. No. 506 Swivel Lock-Type. Packed fifty to carton; five display cards of ten each. The company that took the rattle out of Anti-Rattles

THE AUTOQUIP MFG. CO., Inc., 495 St. Paul St., Rochester, N. Y.





Monogram Light Distributors

Standard Equipment on 30 of America's Foremost Cars

Write for Prices.

MONOGRAM LENS CORP.,
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RELIO
The Van Norman
VALVO

Rello, an electric-drive wet grinder for pistons, pins, valves, bushings, \$475.00. Valvo, an electric-drive bench grinder for valves, valve-seat reamers \$175. See page ads this paper.

Van Norman Machine Tool Co.
Springfield, Mass.



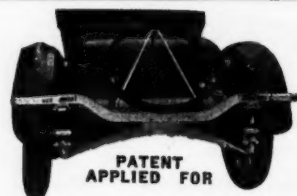
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GARCO

ASBESTOS PRODUCTS

Branches
New York Chicago Pittsburgh
Main Office and Factories: Charleston, S. C.



A & B PLATFORM SPRINGS FOR DODGE CARS

Luxurious Riding Comforts.
Saves Tires and Springs. A Full Bumper Protection.

A & B SPRING MFG. CO.
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BIG PROFITS CHARGING BATTERIES

Small Cash Investment—Big Monthly Earnings

Be the first to offer HB 8 hour charging service. Eliminate competitors with old systems taking 2 or 3 days. Get your HB Constant Potential outfit now on 30-day free trial with money-back guarantee. Small cash payment, long easy terms on balance. Write for information to HOBART BROS. CO., Box AR 402, Troy, Ohio.



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VALVE-FACER

Works like a pencil sharpener. No chatter-marks; a finish equal to any lathe job—in a few minutes. Does a real job. Built by TOOL-MAKERS, Circular.

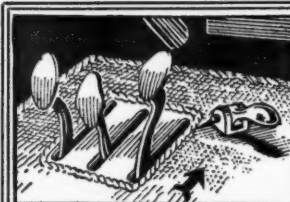
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GATES VULCO

Fan Belts and Radiator Hose

Made By

The World's Largest Makers of Fan Belts



Williams Accelerator for FORD CARS

Comfortable to operate.
The pedal may be swung to any position desired.

WILLIAMS BROS. AIRCRAFT CORP.
San Francisco



For the Motorist's Comfort

INDIANAPOLIS PUMP & TUBE CO.
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ARVIN HEATERS DE LUXE —for winter comfort
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NO-LEAK-O PISTON RINGS

Won't Leak Because They're Sealed With Oil

No-Leak-O Piston Rings are making money for dealers everywhere. Their "oilSEALing" groove—found only in No-Leak-O—packs an oil film in between piston and cylinder walls like "packing" in a pump. Oil and gas stay where they belong. National advertising is helping the dealer sell No-Leak-O by teaching the motorist the lesson of more mileage on less oil and gas. It will pay you to stock No-Leak-O at once. Price 50c and up.

NO-LEAK-O PISTON RING CO., Dept. T-57, Muskegon, Mich.



Be the local Logan Man — Let us show you how easy and how profitable it is to

install Logan Ring Gears.

Kauffman Metal Products Co.
Bellefontaine, Ohio

LOGAN FLY WHEEL RING GEARS

51-6/10 MILES ON A GALLON OF GAS

It is the official world's record-breaking test with Ford Touring car. The new 1922 Stromberg Carburetor and Hot Spot did it—made this marvelous mileage possible. Tens of thousands of Ford owners are now obtaining more miles on a gallon—quicker getaway—easier starting—increased power and speed—all because of having their cars so equipped. Live dealers are requested to write for facts pertaining to territory.

Stromberg Motor Devices Co.

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!WRITE US FIRST!

We carry a complete line of auto parts, Transmissions of all kinds, cylinder blocks, drive shafts, all kinds of new gears, all kinds second hand gears, all makes magnetos, carburetors, starters, rear ends.

400 motors of all kinds in stock.

Mail Orders Given Prompt Attention.

BENNETT BROTHERS

Largest Auto Wreckage in the Country
Grant & Water Sts. Pittsburgh, Pa.

Parts and Repairs

GEARS & SHAFTS

New

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TRANSMISSION AND AXLE
SILENT TIMING GEARS
FLY-WHEEL STARTER GEARS

All Shipments Made Same Day

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If you have stocks of parts, accessories, or supplies for immediate disposal, the logical place to get in touch with your buyers is this Classified Advertising Section.

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Connecting rods for all
make cars**

FORD SPEED SPECIALTIES
Special ALUMINITE racing
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(12 oz.)

HIGH SPEED CAMSHAFTS
POWER-PLUS cylinder head
for Ford cars

**IRON REPLACEMENT
PISTONS**

Green Engineering Co.
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PARTS SHIPPED QUICKLY

Immediate attention given to all new and used parts orders.

Saving 50 to 90%.
Gears, Axles, Bearings, Springs, Magneto and all other parts.

Tell us your wants today.
Isaac A. Welser, 111 Edgewood Ave., New Haven, Conn.

AUTO Save 50 - 90% PARTS

NEW AND USED GEARS, AXLES, BEARINGS, SPRINGS, MAGNETOS, GENERATORS, ETC. JOBBERS IN BANKRUPT AUTO SUPPLIES.

BRIGHTMAN AUTO EXCHANGE
321 Windsor Ave. HARTFORD, CONN.

NEW PARTS FOR ALL CARS

Axle Shafts, Bearings, Gears, Universal Joints, Starting Motors, Lighting Generators, Coils, Magneto, Wheels, Rims, Springs, etc.

Dealers Write for Special Bulletin

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Are You Interested in Regrinding Cylinders?

The Heald Machine Company build a machine expressly for this work. Simple, self-contained, large capacity, and sold at a moderate price.

Regrinding is ideal for small machine shops, auto repair shops and welding concerns.

Let us send you a survey of what others are doing in this business.

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ADAMS AXLE PARTS

FOR

ALLEN, ANDERSON AUBURN, CLIMBER, HARROUN, ELGIN, ELCAR, NORWALK, MONITOR, PAN, PIEDMONT, ECONOMY-VOGUE, SENECA AND SUN

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ANY PART Send for Catalogue

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PARTS

NEW AND USED
for all makes of cars

QUICK SERVICE

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WRITE-WIRE-OR COME TO
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CEDAR RAPIDS, IOWA

NEW and Used PARTS for All Cars

Save 25 to 75%

AUTO SALVAGE & PARTS CO.
Oklahoma City, Okla., U. S. A.

WICHITA AUTO WRECKING CO.

"The Old Reliable"

Offers you quick service, quality parts and absolute satisfaction—and our prices are a little lower. We are an old reliable house and all that implies. Our stock of parts is one of the largest in the country—from a 1907 one cyl. Reo to a 1921 Overland Four.

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Formerly Member Examining Corps., United States Patent Office

American and foreign Patents secured. Searches made to determine patentability and validity. Patent suits conducted. Pamphlet of instruction sent upon request. McGill Building, WASHINGTON, D. C.

Wanted Racing Car

Car complete or motor alone. Must be in good shape and be capable of doing 100 miles on straightaway. Give complete details and lowest price first letter.

Will T. Scott

222 E. Travis St. San Antonio, Texas

Automobile Agency and Garage for Sale

Up-to-date fire-proof garage, show room, accessory room, and shop with good tools and machinery, with storage next door. Agency for Chevrolet line fine sales. Located in county seat of the best agricultural section in Ohio, on two trans-continental highways. A going concern with good returns. Owner wishes to retire from business. Address—

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Four or three passenger body. Prefer new body from salvage company. Can use any nearly new body not priced too high. Must have modern lines. State model and year and condition; give price crated F. O. B. in your first letter.

WILL T. SCOTT

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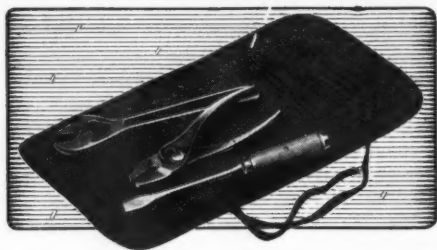
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Retail price.....\$2.35

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He'll soon find the CRESCENT KIT as indispensable in his car as the famous Crescent Wrench is in garage or repair shop.

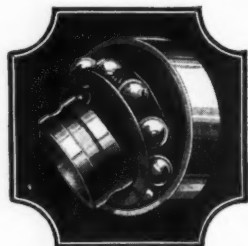
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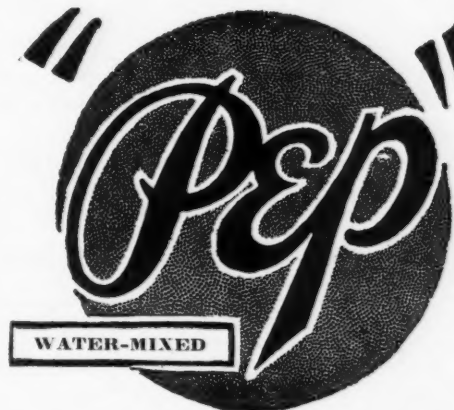
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Pep Valve Compound ☐
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Write name and address in margin in pencil

MA-5

SALABILITY—V

**Stephens Sales Climb Rapidly in
New York's Exacting Market**

In the New York Metropolitan district—the most critical market in America—Stephens climbed close to the top of its price class in cars sold in March and early April.

Eight times as many Stephens cars were delivered as in the same month last year—convincing evidence that the new Stephens models have faultless appearance as well as performance to recommend them.

The first three weeks of April showed even greater increases over 1922, according to R. S. Cole, New York Stephens Distributor. In fact, Stephens *salability* is breaking registration records throughout the whole country.

The seven distinctive Stephens body types have caught the fancy of the buying public. The responsive and flexible power of the Stephens-built six-cylinder motor complete the conquest at the first demonstration.

There are open territories, direct factory connections *and cars* for a few more dealers of Stephens caliber. Write Moline today for full particulars, specifications and catalogue showing the full Stephens line in actual colors.

STEPHENS MOTOR CAR COMPANY, INC., Moline, Ill.

STEPHENS

Finer Motor Cars  *At Lower Prices*

Send for full-color catalogue and contract terms to dealers today

STUTZ SIX

it's
a great
car

[for dealers, particularly]

Touring Car

\$1995

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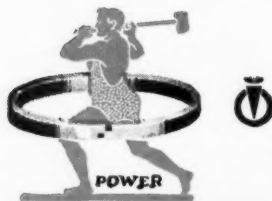
5-Pass. Sedan

\$2550

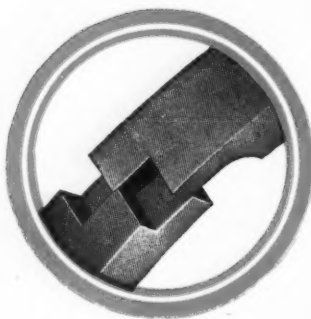
F. O. B. Factory

STUTZ MOTOR CAR COMPANY of AMERICA, Inc., Indianapolis, Indiana
Builders of the Original and Genuine Stutz Motor Cars





Gill



In building a reputation for expert, careful work, your choice of piston rings is all-important.

Bearings may fit ever so snugly, shafts may run true, but what finally counts is piston rings that *do* hold compression and keep out excess oil.

Special

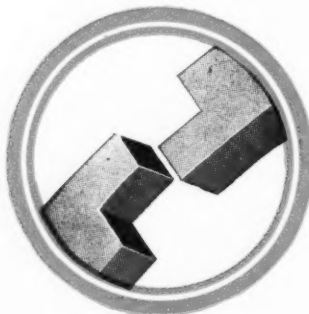
That is why expert repairmen everywhere so strongly prefer one of the three types—Gill, Special, or Servus rings.

All three rings are made of the tough, special grey iron composition that tirelessly resists wear, holding indefinitely its shape, springiness and tension. All three rings are lathe turned for quick setting.



Servus

Gill Interlocking-Joint rings 75c, Special Oil-Wiper 50c, Servus Step-Cut 30c—each is an over-value in every way. Quick service on 11,000 sizes and oversizes from leading jobbers, backed by 36 factory branches. Rings and service that help build reputation!



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